



IFAU – INSTITUTE FOR  
LABOUR MARKET POLICY  
EVALUATION

# **High school students' summer jobs and their ensuing labour market achievement**

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# High school students' summer jobs and their ensuing labour market achievement<sup>♦</sup>

by

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## Abstract

This paper seeks to determine the effect of summer jobs offered by the public sector on high-school students' labour market achievement by use of quasi-experimental data. Many municipalities in Sweden offer summer jobs within their organizations to high-school students. The municipality of Falun randomly allocates about 200 such summer jobs per year by a lottery. Because of this, the effect of a summer job might be determined while the issue of self-selection bias is controlled. Our study finds that summer jobs slightly improve the earnings immediately after graduation from high school, but the effect does not persist.

**Keywords:** intention-to-treat; on-treatment; Wilcoxon-Mann-Whitney test

**JEL-code:** C41, C93, J68

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## Table of contents

1	Introduction .....	3
2	Data description.....	5
3	Identification of the treatment effect .....	14
3.1	Intention-to-treat analysis (ITT).....	16
3.2	On-treatment analysis (OT).....	18
3.3	Results .....	19
4	Concluding discussion.....	23
	References .....	25
	Appendix 1 .....	27

# 1 Introduction

This paper investigates whether a summer job experience helps youths to improve their future earnings when they enter the labour market. This topic carries important implications to labour policy makers worldwide, as it assesses whether early contact with the labour market is an advantage to the youths and therefore whether a government should help to smooth the transition from school to work for the youths, as discussed by Schröder (2004).

Job experience during the summer vacation is common among high school students in most developed countries. It is reported that the taking up rates of summer jobs are increasing in the recent decades in USA as well as in many countries in Europe (Grossman, 1997). Many governments have even implemented various policies to stimulate the expansion of summer jobs and promote student vacation employment. The Clinton Administration's ambitious "national services plan" is one example and the USA Labor Department's "summer job program" in the early 1990s is another (US News & World Report, June.5, 1993). Since summer jobs happen at a crucial period for the youth's personality development, social senses, and human capital accumulation, it may even be that there are external effects of summer jobs on the society as a whole.

Ruhm (1997) provides a survey of the literature on how school-year employment might affect high school students' future earnings when they enter the labour market. By intuition, most people would like to think that the summer job experience should be beneficial to the students and their future outcomes. Favourable arguments are: summer jobs help teenagers to mature faster than otherwise and they provide skills and knowledge that complements in-class education; the summer jobs give high-school students feedback on what they have learned, and offer hints what they need to study and enhance their motivations to study; the earnings from summer jobs can help poor students to relax their financial constraints on future education and human capital investment; the students may use the summer jobs to smooth the transition from school to work by collecting information and establishing a social network that helps in finding the first

regular job. See for example Häkkinen (2003) and Carling & Larsson (2004).

However, the potential negative consequences of summer job experiences are also discussed in the literature (Ruhm, 1997). For instance, summer jobs with heavy commitment may make students too exhausted and less fit for the new semester; too easy money from summer jobs may detract students' interest in the "boring" and seemingly "unproductive" in-class education; too early contacts with society may destroy teenagers if they are not well protected from bad social behaviours (Weller *et al.*, 2003).

Arguments aside, the effect of a summer job experience is left to be identified empirically, which is a rather difficult task. First, there are very few datasets suitable for this purpose. Information about summer jobs and holders of such are rarely kept in record. Second, the methodology to analyze this question faces some challenges; the biggest one is the issue of selection bias: A summer job follows as a consequence 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. But the access to and the knowledge about such variables is often lacking.

For this study, we have access to quasi-experimental data. Since 1995, the municipality of Falun, a mid-size town in Central Sweden, allocated the publicly-provided summer jobs to all high school applicants on a lottery basis. Since the offers of summer jobs were randomly allocated to the applicants, it exists a unique quasi-experimental setting in which there is good control of the potential selection bias. Furthermore, we have data of good quality providing detailed background information of the applicants for those who were offered a summer job as well as for those who were not, including variables such as age, gender, school and class, grades, and lengths and frequencies of summer jobs. We follow the applicants of the years 1995 to 2002 (except for 1996), and compare the ensuing earnings, after they have finished high-school and entered the labour market, for those with a summer job with those without a summer job.

We find that summer jobs improve the earnings at the initial period on the labour market, but there are no significant long-run effects.

The remainder of this paper is organized into three parts. Section 2 describes the data we use in this paper and Section 3 presents the identification strategy and utilizes the data to examine the effect of summer jobs on earnings. Finally, section 4 states our major findings and provides a concluding discussion relating to other relevant studies.

## 2 Data description

For the evaluation purpose, this paper employs the experimental database and compares the labour market outcomes between the high school students who took the summer jobs with those who did not. Since 1995, the municipality of Falun offers summer jobs to the high school students during the summer vacations every year in order to assist the youth to get the early contact with the labour market and thus an easier transition from the school to the labour market when they graduate.<sup>1</sup> The municipality offers summer job opportunities within the organization and assigns the summer jobs to all high school student applicants on a lottery base.<sup>2</sup> Such practice actually comprises an ideal social experiment to test the effects of summer jobs. Here the treatment group is those who applied and got a summer job at the municipality of Falun while the control group is those who applied but were denied a summer job.

Every summer, the municipality offers around 200 summer jobs and around 800 high school students apply for these jobs of among approximately 2,700 students enrolled in the high schools in Falun.

The summer jobs offered by the municipality are three weeks with tasks related to the activities that take place in the municipality. One major activity is in Health and Care which is about taking care of elderly people in the resting homes, a job that is rarely offered in the private sector. Another major activity is cleaning jobs in the properties of the municipi-

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<sup>1</sup> In this paper, we consider high school students those of an age ranging between 16 and 19 years.

<sup>2</sup> The summer jobs at the municipality of Falun are fully comparable to summer jobs in the private sector regarding factors like working hours, obedience to the supervisor, the need to show positive attitude towards colleagues and customers, to perform the tasks well, and to show ambition.

pality as well as handy work related to the parks, roads and buildings maintained by the municipality.

The municipalities in Sweden run the schools and starting from the year 2002, the municipality of Falun offers a summer-school directed to pupils at the upper elementary school in English, Swedish and Mathematics. Strong students at the last year of high-school could apply for a summer job at the municipality as a teaching position.<sup>3</sup> For all other activities all high-school students were considered eligible for the summer job.

**Table 1** Number of students who applied for a summer job at the municipality of Falun

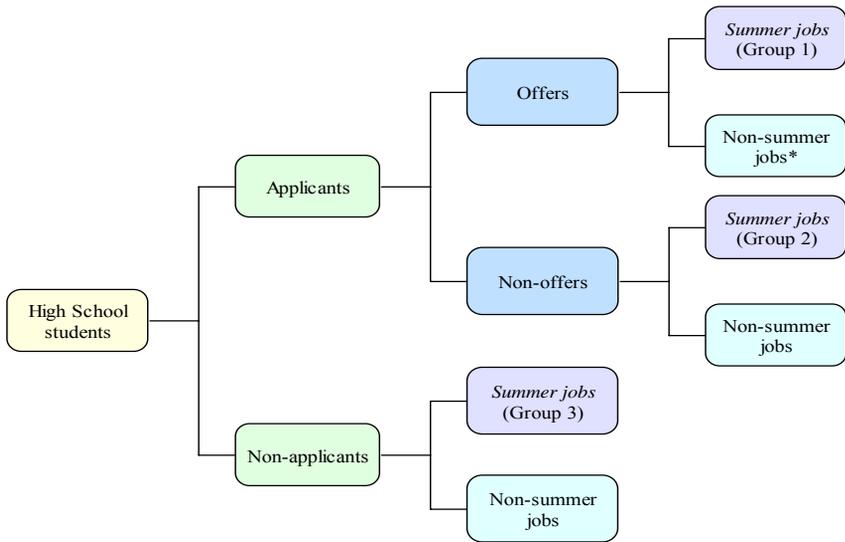
Year	Applicants	Non-applicants	Total
1995	158	2 582	2 740
1997	570	2 153	2 723
1998	878	1 949	2 827
1999	820	1 944	2 764
2000	823	1 937	2 760
2001	872	1 997	2 869
2002	689	2 233	2 922

The jobs are offered only during the summer and the workplace (being for instance the cleaning department or the maintenance department) was compensated from the municipality so that the summer jobs should only marginally affect the budget of the activity. The payment is between 42 and 52 SEK (i.e. €4–5) per hour depending on age (students working as tutors at the summer school were paid 60 SEK).

Altogether, our data set contains the information of all the 4,810 high school students aged 16–19 who applied for summer jobs offered by the

<sup>3</sup> The year 2002, there were 57 applicants to the teaching position and 8 were offered after the lottery. The remaining 49 took part in the ordinary lottery of the summer jobs. We can not identify the 8 “teachers” amongst the applicants, which might bias the results slightly. However, the fact that they are only 8 out of 2 142 makes us believe that the problem can be regarded as minor.

municipality of Falun between 1995 and 2002, excluding 1996.<sup>4</sup> The more detailed annual information with reference to the distribution of the data is illustrated in Table 1.



**Figure 1** Schematic description of applying for and holding a summer job at the municipality.

In Table 1, Applicants denote the number of high school students who applied for the summer jobs at the municipality and Non-applicants indicates the number of students who did not apply for the summer jobs at the municipality of Falun. The last term in Table 1, Total, stands for the total high school students aged 16–19 in the municipality in every year. The year of 1995 is the first year when the municipality began to offer the summer jobs. Presumably, the practice was not widely known to the

<sup>4</sup> The municipality of Falun lost the file concerning the information of summer jobs in 1996.

students at that time and only 158 students submitted an application in 1995.

The schematic description of this social experiment is provided in Figure 1. It shows three groups consisting of students with a summer job: Group 1 is those who applied, were offered and accepted a summer job at the municipality of Falun; Group 2 is those who applied for, but were denied, a summer job at the municipality yet found one with another employer; Group 3 is those who did not apply but found a summer job by themselves at another employer.

We obtain administration data of summer job applicants from the municipality of Falun. This data contains the information of their civic registration numbers, whether and when they participated in the summer jobs as well as some personal characteristics. Meanwhile, Statistics Sweden (SCB) supplied us with more detailed information like the ensuing labour market outcomes, demographic and households' characteristics as well as lower secondary and high-school grades.

In Table 2 the individual labour market earnings from the summer jobs is presented for all high-school students in Falun with a summer job. The mean earnings vary a little from year to year and correspond to about 70 percent of an average adult worker's monthly earnings. Hence, it is a qualified guess that the students work on average about four to five weeks during the summer vacation, which is between eight to ten weeks. The high maximum earnings indicate that there are some students who are not only holding a summer job, but also work substantial hours during the other parts of the year.

**Table 2** Annual earnings of summer jobbers in SEK and deflated by CPI.

Year	1995	1997	1998	1999	2000	2001	2002
Earnings							
Mean	9 064	9 090	12 560	9 692	10 550	9 856	11 183
Maximum	59 101	66 066	19 533	11 1734	11 9456	62 513	110 200

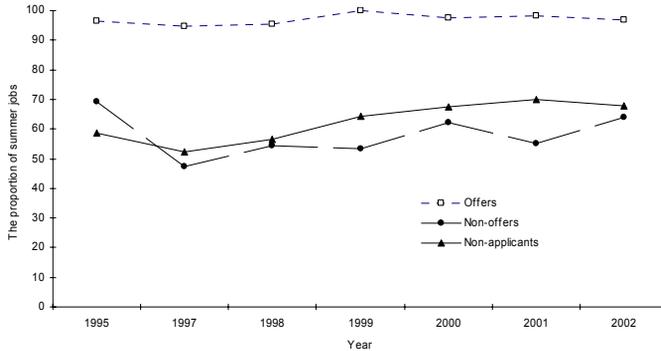
Table 3 shows the age distribution of the students who applied for a summer job at the municipality. The distribution is roughly uniform until 1998, when there is a shift to the left in the centre of the distribution

meaning that older high-school students were less inclined to apply for a job at the municipality.

**Table 3** The age distribution of applicants.

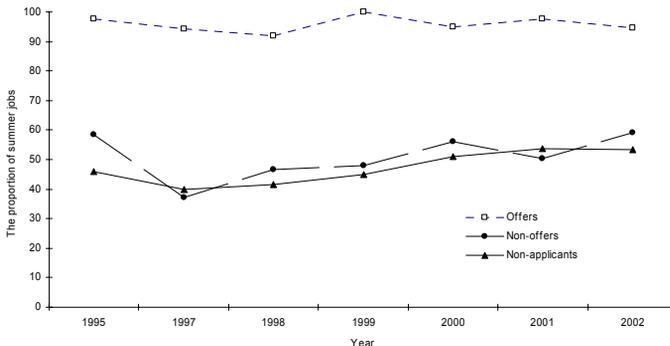
Year \ Age	1995	1997	1998	1999	2000	2001	2002
16	37	101	140	194	247	274	164
17	41	197	249	331	314	346	282
18	53	152	291	279	258	245	222
19	27	120	198	16	4	7	21
Total	158	570	878	820	823	872	689

Figure 2 shows the proportion of students holding a summer job of all high school students in Falun for the years 1995 to 2002, excluding 1996. In general, almost 100 percent of the applicants who were offered a summer job by the municipality also accepted it, while around 60 percent of the denied applicants still managed to find a summer job at some other employer than the municipality. The latter figure is similar to the proportion of non-applicants who managed to find a job. The fact that the proportion amongst the denied applicants is as high as 60 percent has some implication for the evaluation of the policy of the municipality. Clearly the students would have had a high chance of finding a summer job even in the absence of this policy. This issue will be discussed in the next section.

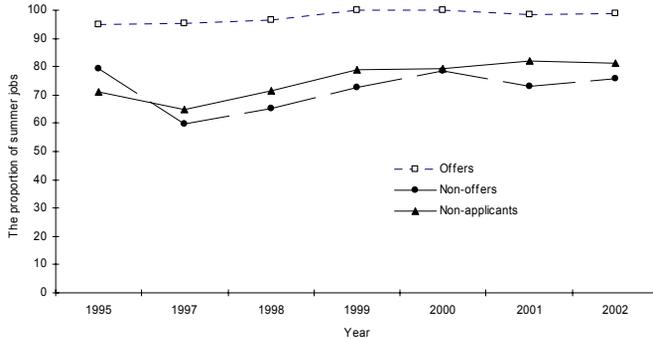


**Figure 2** The proportion of summer jobs. The curves are shown for applicants with and without an offer from the municipality as well as for those who did not apply for a summer job at the municipality.

Figure 3 and Figure 4 show whether the summer job ratio differs by age group by showing the young students (16–17 years) and old students (18–19 years) separately.

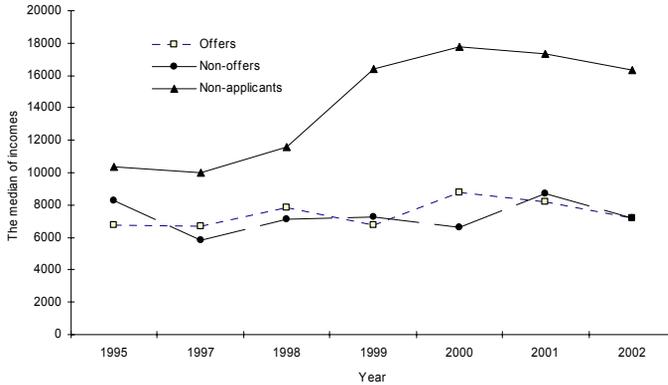


**Figure 3** The proportion of summer jobs in the age 16–17 years. The curves are shown for applicants with and without an offer as well as for those who did not apply for a summer job at the municipality.



**Figure 4** The proportion of summer jobs in the age 18–19 years. The curves are shown for applicants with and without an offer as well as for those who did not apply for a summer job at the municipality.

In Figures 5–7, the median earnings from the summer job is shown. The solid lines show those who were offered a summer job at the municipality, the dashed lines show those who applied and were denied a summer job at the municipality and the dotted lines show the median earnings for the non-applicants. Figure 5 shows the median annual earnings of summer job takers for all high school students, ages 16–19, over 1995–2002, except for 1996. The difference between the applicants is small, no matter whether they were offered a summer job of the municipality or they had to find it themselves.

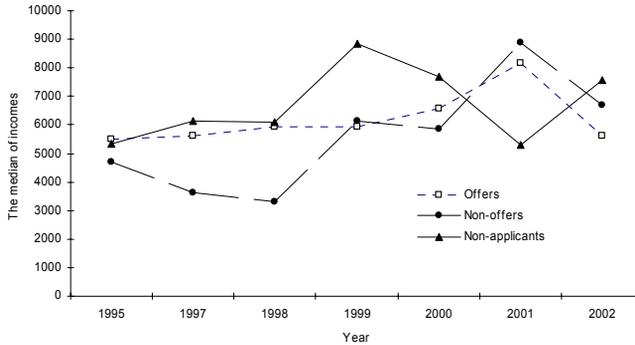


**Figure 5** The median annual earnings for summer jobbers in SEK and deflated by CPI. The curves are shown for applicants with and without an offer from the municipality as well as for those who did not apply for a summer job at the municipality.

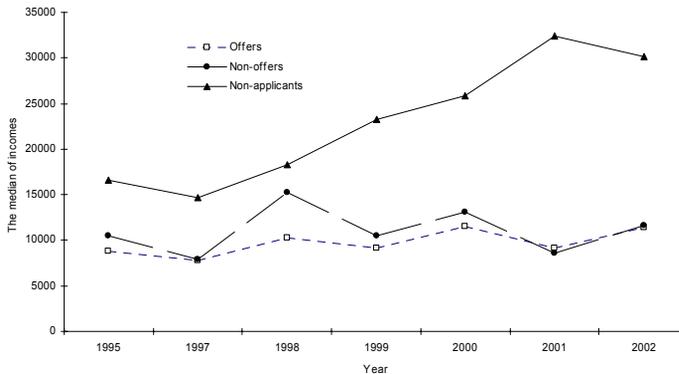
However, the non-applicants earned much more from private summer jobs than applicants. This indicates that there is a large difference between the applicants and non-applicants. Non-applicants may have stronger earnings capability or be more informed about good summer job opportunities or for some other reasons have better offers in hand and these reasons might also explain why they did not bother with applying at the municipality. The difference in earnings may be due to the different wages or different number of worked hours or both.

It should be noted, though, that the summer jobs at the municipality are neither better nor worse than the private summer jobs in terms of earnings comparing only successful and unsuccessful applicants.

If we decompose the students into two age-groups, 16–17 and 18–19 years, we find that the difference between applicant and non-applicant is small in the 16–17 group whereas it is high in the 18–19 group. This may reflect that when students are young, their individual capability does not vary a lot, but as they become mature, the individual heterogeneity becomes a matter of concern. Meanwhile, for 16–17 applicants, the summer jobs provided by the municipality of Falun seem to show advantages relative to private ones in 2001.



**Figure 6** The median annual earnings for summer jobbers in SEK and deflated by CPI (age 16–17 years). The curves are shown for applicants with and without an offer from the municipality as well as for those who did not apply for a summer job at the municipality.



**Figure 7** The median annual earnings for summer jobbers in SEK and deflated by CPI (age 18–19 years). The curves are shown for applicants with and without an offer from the municipality as well as for those who did not apply for a summer job at the municipality.

The objective of this paper is to investigate whether summer jobs would positively or negatively affect one’s future labour market performance and economic attainment. We have to examine this question empirically. And, we will focus only on the applicants, since we do not know how the non-applicants were selected into summer jobs.

### 3 Identification of the treatment effect

As previously stated, we focus only on the applicants to determine the effect of a summer job on the ensuing earnings. The data set contains 4,810 applications<sup>5</sup>. However, the students may have applied several times over the years and we classify her as a summer jobber if at least once she has been offered and accepted a job. For example, let's assume we have three students, A, B and C. All of them applied for a summer job in three consecutive years. Student A got a summer job in years 1 and 2. Student B got a summer job in year 3, but Student C never got a summer job in these three years. In this example students A and B are classified into the summer job group, whereas student C is classified into the non-summer job group. This way of classification leaves us with 3,197 students classified as summer jobbers or non-summer jobbers.

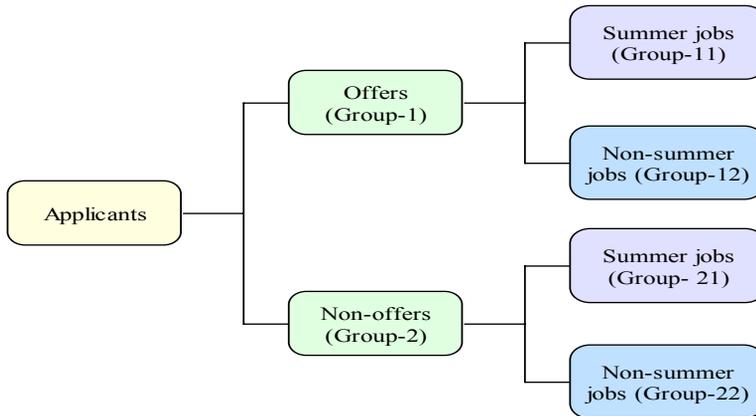
The consecutive offers might have effect on the student's future earnings since several summer jobs might leave to a greater effect than a single summer job. We have chosen to neglect such potential dose effect since the vast majority (92%) were offered summer jobs only once by the municipality. Hence, in the empirical analysis it should be understood that the effect refers to summer job but to a small extent it is masked by the effect of multiple summer jobs.

Figur 8 is a part of Figure 1, thus, the definition and explanation of the figure are the same as in the previous section. The reference numbers of the groups and the sub-groups are given in the figure. As mentioned before, all applicants are randomized to summer jobs by a lottery. It is not obvious whether summer jobbers should be compared to non-summer jobbers (i.e. Groups 11 and 21 against Groups 12 and 22) or whether applicants with an offer should be compared with denied applicants (i.e. Group 1 against Group 2). This issue is discussed in subsections 3.1 and 3.2, but for the time being we focus on a comparison between offered and denied applicants since the lottery was designed for this purpose.

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<sup>5</sup> This figure includes applicants of age under 16. We have however excluded the applications that were submitted while the student was of an age less than 16.

Table 4 shows more detailed information of applicants in order to examine whether there is any systematic difference between the applicants with an offer and applicants that were denied. If the lottery was fair we would not expect any difference between the treatment group (offered) and the control group (not-offered).



**Figur 8** The illustration of potential treatment groups and control groups.

In Table 4 the lower secondary grade of applicants is the percentile ranked grade point average. In Sweden, the grading system was reformed 1997 and in order to connect the grades of the old system to that of the new system, we have used the percentile rank of the grades. As Table 4 shows, the variable Age is statistically significant at a 5% level. The difference in age between the treatment group and control group is approximately half a year. The reason for a significant difference in age may be due to rounding, for example, if the age of a student is 16.6 years, we consider her as 17 years. We know the year of birth and application but not the month of birth. Swedish labour laws make a distinction between those above and below 16. Most likely, students turning 16 after the summer would have a smaller chance of getting an offer, since they may have been deemed ineligible for a summer job. For this reason, the treatment group's average age might be expected to be higher than the control group's.

There is no significant difference in the grades for offered and non-offered applicants. It might however be a difference in Gender between the groups, even though for most years the difference is insignificant on

conventional test levels. A gender difference is puzzling and we have contacted the municipality but they have not been able to offer an explanation. Nor have we been able to come across a proper explanation to the gender difference. After having put much effort into explaining the difference, we are inclined to consider it a prank of the lottery and we maintain the belief that the lottery was fair and that the job offers were randomized.

**Table 4** A comparison of background variables for the applicants with and without an offer of a summer job.

Year	Age		Gender <sup>a</sup>			Grade <sup>b</sup>	
	Offer	Non-offer	Offer	Non-offer	Difference	Offer	Non-offer
1995	17.27 (0.16)	17.29 (0.16)	0.45 (0.06)	0.54 (0.05)	0.09 (0.08)	0.60 (0.03)	0.59 (0.03)
1997	17.88* (0.11)	17.39 (0.05)	0.34 (0.02)	0.43 (0.05)	0.09 (0.05)	0.56 (0.03)	0.62 (0.01)
1998	18.11* (0.05)	17.37 (0.04)	0.43 (0.02)	0.39 (0.03)	-0.04 (0.04)	0.59 (0.01)	0.62 (0.01)
1999	17.65* (0.04)	16.92 (0.03)	0.35 (0.02)	0.44 (0.03)	0.09* (0.04)	0.60 (0.02)	0.60 (0.01)
2000	17.41* (0.05)	16.92 (0.03)	0.35 (0.02)	0.48 (0.04)	0.13* (0.04)	0.61 (0.02)	0.60 (0.01)
2001	17.39* (0.04)	16.81 (0.03)	0.48 (0.02)	0.52 (0.03)	0.04 (0.04)	0.63 (0.02)	0.61 (0.01)
2002	17.57* (0.06)	17.04 (0.04)	0.37 (0.02)	0.49 (0.04)	0.12* (0.04)	0.64 (0.03)	0.62 (0.02)

Notes: \*significant at 5% level, values in parentheses are standard errors. Difference is the difference between Non-offer and offer. a) The proportion of males. b) The student's lower secondary grade, as a percentile rank.

We now turn to the question whether offered should be compared to not-offered applicants or whether summer jobbers should be compared to non-summer jobbers.

### 3.1 Intention-to-treat analysis (ITT)

Intention-to-treat is an analysis approach for randomized controlled trials that compares observations in the groups to which they were originally

randomly assigned, regardless of whether they actually satisfied the entry criteria, regardless of whether they actually received the treatment, and ignoring subsequent withdrawal or deviation from the protocol (Hollis & Campbell, 1999). Hence, the principle of ITT analysis is that all observations must be analyzed with respect to the group to which they were randomized and a popular phrase used to describe ITT analysis is "Analyze as randomized!" (Dallal, 2004). An ITT analysis maintains the treatment groups (and the control groups) that are similar apart from the random variation. This is of course the one reason for randomizing, and this feature may be lost if the analysis is not performed on the groups produced by the randomization process.

In our case, the treatment group is those who got the offers of summer jobs from the municipality of Falun and the control group is those who were not offered a summer job by the municipality, that is, Group 1 and Group 2 as described in Figur 8. Table 5 shows how the effect of a summer job may be defined and for the ITT analysis the estimate is obtained by taking the difference between  $\alpha_1$  and  $\alpha_2$ . The estimates of the ITT-parameters are shown in Table 6.

As stated above, all individuals randomly assigned to one of the treatments are analyzed together, regardless of whether or not they completed or received that treatment. However, sometimes it happens that some of the individuals in a randomized controlled study do not actually receive the treatment to which they were assigned. There can be many reasons for this: for instance, in our case, a student may give up the summer job opportunity for some private reason even if she had such an offer.

Deviations from randomized allocation often result in missing outcome data. For this study, almost everyone offered also accepted the summer job. However, a majority who were not offered managed, nevertheless, to find a summer job with another employer. A full application of ITT analysis is possible only when complete outcome data are available for all randomized subjects. Hence, the fact that the control group consists of summer jobbers implies that ITT-estimates is informative on the effect of being offered a summer job, which is not equivalent to actually having the experience of a summer job. To deal with this shortcoming of the ITT analysis we will also implement an on-treatment analysis as discussed below.

### 3.2 On-treatment analysis (OT)

The alternative to an ITT analysis is the on-treatment analysis. Here, the treatment group is defined as those who were offered and accepted a summer job at the municipality of Falun as well as those who were not offered a summer job by the municipality, but nonetheless found a summer job by themselves (i.e., the subgroups 11 and 21 in Figur 8), whereas the control group is those who were offered a summer job by the municipality, but turned down the job offers as well as those who were not offered by the municipality and failed or did not bother to find a summer job with another employer (i.e., subgroups 12 and 22 in Figure 8). The effect of a summer job according to the OT analysis is defined to be the difference between  $\beta_1$  and  $\beta_2$  as illustrated in Table 5. The estimates of OT-parameters are shown in Table 6.

**Table 5** The effects of summer jobs. ITT =  $\alpha_1 - \alpha_2$  and OT =  $\beta_1 - \beta_2$ .

	SJ	Non-SJ	
Offers	Group-11	Group-12	$\alpha_1$ (Group-1)
Non-offers	Group-21	Group-22	$\alpha_2$ (Group-2)
	$\beta_1$ (Groups 11 and 21)	$\beta_2$ (Groups 12 and 22)	

In the analysis we need a measure that describes the centre of the distribution, for each group, of the outcome variable, being future earnings. We consider the median preferable to the mean since the distribution might be skewed and may be contaminated with outliers, for instance due to a few students working all around the year. In Table 5, ITT-parameters  $\alpha_1$  and  $\alpha_2$  denote the median of labour market earnings of the applicants who were and were not offered a summer job at the municipality, respectively. The OT-parameters  $\beta_1$  and  $\beta_2$  denote the median of labour market earnings of the applicants with and without a summer job, respectively. The notation is maintained in Table 6 which provides the resulting estimates of the parameters.

### 3.3 Results

Table 6 gives the earnings of the former high school students when they were 19 years old (as year 0) and entered the labour market, and the evolution of the earnings over the subsequent years up to seven years after finishing high-school. We assume that the high school students graduate at 19 years, and then enter the labour market. In reality some few students may actually graduate one year before or after the age of 19 due to deviations from the standard schooling schedule.

The earnings are the real earnings as they have been deflated by CPI in 2002 as the base year. In Table 6,  $N_{\alpha_1}$  and  $N_{\alpha_2}$  are the number of students who were offered a summer job at the municipality and the number who were not offered, respectively. Likewise  $N_{\beta_1}$  and  $N_{\beta_2}$  stand for the number of individuals with and without a summer job.

**Table 6** The effect of summer jobs on median earnings for high school students after graduation at the age of 19 years.

Year (t)	$\alpha_1$ ( $N_{\alpha_1}$ )	$\alpha_2$ ( $N_{\alpha_2}$ )	$\alpha_1 - \alpha_2$	$\beta_1$ ( $N_{\beta_1}$ )	$\beta_2$ ( $N_{\beta_2}$ )	$\beta_1 - \beta_2$
t=0	53427 (940)	43730 (1202)	9697*	49219 (1430)	44067 (712)	5153
t=1	45950 (742)	42030 (966)	3920	44443 (1158)	42200 (550)	2243
t=2	47906 (579)	54700 (687)	-6794	51057 (884)	52600 (382)	-1543
t=3	43900 (387)	53500 (481)	-9600	48408 (602)	53259 (266)	-4850
t=4	50562 (237)	63000 (279)	-12438*	55975 (371)	59551 (145)	-3575
t=5	97242 (83)	53000 (141)	44242	84750 (174)	42955 (50)	41795
t=6	174055 (39)	76100 (39)	97955	142695 (70)	46411 (8)	96284
t=7	218400 (15)	91500 (11)	126900	204200 (23)	69300 (3)	134900

Note: \* Significant at 5% level according to the Wilcoxon- Mann-Whitney (WMW) test.

We have pooled the applicants from the years 1995, 1997–2002 into one data set and the table shows the outcome for the pooled data. The reason for pooling is of course a desire to base the estimates on a large data set.

Yet the number of students used for estimating the long-term effect, say five years after graduation, is meagre, which is due to the fact that only the applicants of 1995 have been observed for sufficiently many years after graduation.

Within each year, the summer job allocation procedure is random. Therefore, we should only compare summer jobbers to non-summer jobbers who applied the same year. We have done this to see whether the time effect seems similar for different application cohorts. To be approximately true we decided to pool the cohorts in order to get higher precision in the estimates. The interpretation should of course be that we estimate the time effect as an average over the application cohorts. In appendix 1 we show the year-by-year outcomes.

Conventionally, earnings data is analysed after transforming the original earnings by a log-transformation with a wish that the transformation leads to a normal distribution such that the common t-test can be employed. The problem of this approach is that simply comparing the means of the log-transformed data in two groups can produce a different conclusion to a comparison of the means of the original data (Krishnamoorthy & Mathew, 2003). To examine the effects of summer job experiences on high school students, according to the result of Wang (2006), the Wilcoxon-Mann-Whitney (WMW) test is employed here and the results are illustrated in Table 6. In addition, we have also used the t-test with the log-transform data.

From Table 6, we do find a positive sign on the summer job effects and it is statistically significant at the initial period of entering the labour market. However, after 4 years of graduation, the difference is significant as well. It seems that there is a negative effect on the students who continue to study in the university at the initial period of entering the labour market. However, the effect of summer job experiences is only statistically significant at the initial period of entering the labour market but statistically insignificant in all later periods. It looks like that the effect of the summer job participation, if there is any, vanishes quickly.

Furthermore, focusing on the results from the on-treatment analysis, the summer jobs seem to have no effect at all for the high school students. Recall, though, that the on-treatment analysis might be subject to selection bias as the original randomization procedure is distorted in this approach.

An intriguing fact is that the estimated long-term effect is very large, although statistically insignificant. It would have been nice to have access to a larger sample which would reduce the statistical uncertainty. However, the standard errors of the estimates could also be reduced by conditioning on variables which contributes to the variation in earnings. We do this below, but it should be recalled that the conditioning on the variables was not part of the randomization procedure and, therefore, the conditioning might introduce selection bias and thereby rendering the results invalid.

The approach is to use log-transformed earnings ( $w$ ) and a regression model to test the summer job effects. The first pair of models estimates the effect of the offer on the log-transformed earnings as,

$$(1a) \quad \ln(w_{it}) = a_{1t} + \alpha_{1t} O_i + \varepsilon_{1it}$$

$$(1b) \quad \ln(w_{it}) = a_{2t} + \alpha_{2t} O_i + \sum_{p=1}^P x_{ip} \gamma_p + \varepsilon_{2it}$$

where  $w_{it}$  is the earnings of the  $i$ th student  $t$  years after graduation and  $O_i$  is an indicator taking on unity if the student was offered a summer job and zero otherwise. The error-term  $\varepsilon$  is assumed to be independent between students and over time. The background information, as a variable denoted  $x$  of which it is assumed to exist  $P$ , includes all the significant background variables, that is, gender, age, log of family earnings and the grade of lower secondary school as well as the year of application. The parameters of interest are  $\alpha_{1t}$  and  $\alpha_{2t}$  which show the effect of the offer on the log earnings. Table 7 gives the estimates of the two parameters.

In a second pair of models the effect of a summer job is studied. The set up of the models is similar to Models (1a) and (1b), except for  $O_i$  being replaced with  $SJ_i$ , that is an indicator taking on unity if student  $i$  have had a summer job,

$$(2a) \quad \ln(w_{it}) = a_{3t} + \beta_{1t} SJ_i + \varepsilon_{3it}$$

$$(2b) \quad \ln(w_{it}) = a_{4t} + \beta_{2t} SJ_i + \sum_{p=1}^P x_{ip} \phi_p + \varepsilon_{4it}$$

The estimates of  $\beta_{1t}$  and  $\beta_{2t}$  are shown in Table 7.

In addition to the background variables mentioned above we considered additional ones, such as, the parents sector of occupation, socioeconomic and migration status, but these variables were excluded since they were found to be statistically insignificant at the 5 % level.

**Table 7** The effect of an offer and a summer job on the log-earnings for high school students after graduation.

Year (t)	$A_1$ (SE)	$\alpha_2$ (SE)	$\beta_1$ (SE)	$\beta_2$ (SE)
t=0	0.73* (0.18)	0.89* (0.18)	1.46* (0.18)	1.72* (0.19)
t=1	0.01 (0.18)	0.15 (0.18)	0.41* (0.19)	0.62* (0.19)
t=2	-0.14 (0.20)	0.10 (0.21)	0.33 (0.21)	0.57* (0.22)
t=3	0.04 (0.22)	0.02 (0.24)	0.27 (0.24)	0.31 (0.24)
t=4	-0.60* (0.30)	-0.48 (0.33)	-0.12 (0.33)	0.05 (0.34)
t=5	0.69 (0.44)	0.50 (0.45)	1.03* (0.50)	1.01* (0.51)
t=6	0.64 (0.91)	0.58 (0.94)	3.16* (1.47)	3.42* (1.56)
t=7	1.73 (1.55)	1.42 (1.55)	3.24 (2.37)	2.59 (2.45)

Note: \* Significant at 5% level; values in the parentheses are standard errors.

There is a small difference between Table 6 and Table 7 with regard to the effect of a summer job offer at the municipality, which should be expected as Table 7 provides the estimates of a different treatment parameter. However, the qualitative conclusion is, once again, that there is only a momentary effect of the offer on the earnings after the graduation.

The last column of Table 7 gives the effect-estimates of a summer job after controlling for background variables. The effect of a summer job is positive and sometimes statistically significant, and thus differs somewhat from what was reported in Table 6. It should, however, be recalled that the lottery concerned the offer, not the summer job, and therefore we can not rule out the possibility of selection bias in this result.

## 4 Concluding discussion

In this paper the effect of summer jobs on students' later labour market outcomes is examined by both intention-to-treat (ITT) analysis and on-treatment (OT) analysis on quasi-experimental data collected the municipality of Falun.

The evidence in our study suggests that the experience of a summer job does provide a significant effect on the earnings when the students enter the labour market, but nearly no further effect on their later labour market performance. Hence, even if we accept that the summer job experiences have effects on earnings at the beginning period of post high school career, such effects are not persistent. This finding is consistent with Häkkinen (2003), where the author examined school-year employment among Finnish university students and found that working while enrolled at the university did have a positive impact on the graduates' employment chances and earnings for the university students after graduation, but the effect vanishes as they stay on the labour market.

Such an observation seems to imply that a summer job experience of high school students in Sweden only provide a short-run advantage via channels like early labour market contacts, but no effect on the student's productivity as demanded by the Swedish labour market. It means that the summer jobbers may gain when entering in the labour market for reasons such as them being more familiar with the labour market institutions or with a better work habit.

Our results contradict the findings of Ruhm (1997) in USA, where he found indications that school-year employment of high school students in the US helped them to gain skills and knowledge via on-the-job practice and thereby raised their long-term productivity. The inconsistency between our study and Ruhm (1997) could arise from the different empirical setting-ups and techniques used in the two papers, but most likely due to the differences in the contents and types of school-year employments in USA and Sweden, as well as in the differences between the labour market institutions of the two countries. But to substantiate the claim above, more future research is required to assess whether the summer jobs provided by the municipality of Falun is similar to the actual jobs available in Sweden or in USA.

Since the conventional summer job experience is not providing the students with a long-term advantage, a policy implication which can be drawn from our study is that, for the aim to make the summer job experiences more valuable and make government intervention in the youths' transition from school to work more effective, the skills matching between summer jobs and actual jobs in the labour market should be paid more attention.

Although, it would be very interesting to see what happens to the students' long-run earnings when they participate in the summer job program and when they do not. We can not make any strong conclusion in this connection from our data as the numbers of observation in later years (from year 5 to 7) are comparatively low (cf Table 6). We acknowledge this shortcoming of the present of study and suggest further study in this direction with insuring sufficiently large data for the later years.

## References

- Carling, K. & Larsson, L. (2005), “Does early intervention help the unemployed youth?”, *Labour Economics*, 12:3, 301–319.
- Dallal, G. E. (2004), *The Little Handbook of Statistical Practice*, Tufts University, <<http://www.tufts.edu/~gdallal/LHSP.HTM>>, 16<sup>th</sup>. Dec. 2004.
- Grossman, Robert J. (1997). “Summer jobs”, *Human Resources Magazine*, 42:4, 100–106.
- Hollis, S. & Campbell, F. (1999), “What is meant by intention to treat analysis? Survey of published randomized controlled trials”, *British Medical Journal*, 319, 670–674.
- Häkkinen, Iida (2003), “Working while enrolled in a university: Does it pay?”, Manuscript, Department of Economics, Uppsala University, 2003.
- Krishnamoorthy, K. & Mathew, T. (2003), “Inferences on the means of lognormal distributions using generalized  $p$ -values and generalized confidence intervals”, *Journal of Statistical Planning and Inference*, 115, 103–121.
- Maritz, J. S. (1995), *Distribution-free statistical methods*, Monographs on statistics and applied probability 17, Second edition, Chapman & Hall, London.
- Ruhm, C. J. (1997), “Is high school employment consumption or investment?”, *Journal of Labor Economics*, 15, 735–776.
- Schröder, L. (2004), “The role of youth program in the transition from school to work”, IFAU, Institute for Labour Market Policy Evaluation, Working Paper 2004:5.
- U.S. News & World Report (1993), “A different kind of summer”, 115:1, 11–13.
- Wang, I. J. Y. (2006), “Small sample inference for two-sample median tests”, Department of Information Science/Statistics, Uppsala University, upcoming Working Paper.

Weller, Nancy F; Cooper, Sharon P; Basen-Engquist, K; Kelder, S.K; Tortolero, S.R. (2003), "School-year employment among high school students: effects on academic, social, and physical functioning", *Adolescence*, 38:151, 441–459.

# Appendix 1

**Table 1** The median earnings for offered and non-offered high school students after turning 19 years.

Year t	1995		1997		1998		1999		2000		2001		2002	
	Offer	Non-offer	Offer	Non-offer	Offer	Non-offer	Offer	Non-offer	Offer	Non-offer	Offer	Non-offer	Offer	Non-offer
t=0	287 (82)	207 (71)	297 (80)	357 (328)	524 (314)	452 (298)	575 (202)	525 (319)	735 (133)	534 (154)	708 (121)	304 (31)	278 (8)	472 (1)
t=1	206 (80)	243 (71)	275 (81)	394 (329)	505 (315)	493 (298)	609 (197)	466 (212)	537 (66)	336 (56)	228 (3)	* (0)		
t=2	277 (79)	283 (70)	519 (81)	553 (327)	535 (293)	573 (229)	438 (124)	549 (61)	243 (2)	* (0)				
t=3	343 (79)	525 (69)	429 (74)	525 (271)	483 (229)	553 (134)	836 (5)	953 (7)						
t=4	560 (79)	548 (69)	620 (45)	712 (171)	464 (113)	685 (39)								
t=5	967 (58)	901 (56)	977 (25)	447 (85)										
t=6	1741 (39)	761 (39)												
t=7	2184 (15)	915 (11)												

Note: \* is missing value; the unit is 100 SEK; values in parentheses are the number of students.

**Table 2** The median earnings of summer-jobbers and non-summer-jobbers after turning 19 years.

Year t	1995		1997		1998		1999		2000		2001		2002	
	SJ	Non-SJ	SJ	Non-SJ	SJ	Non-SJ								
t=0	260 (132)	138 (21)	411 (237)	253 (177)	467 (404)	473 (208)	560 (360)	443 (161)	637 (186)	580 (101)	634 (110)	699 (42)	242 (7)	504 (2)
t=1	220 (132)	243 (21)	342 (233)	415 (177)	507 (404)	449 (209)	590 (311)	365 (98)	402 (77)	539 (45)	228 (3)	*		
t=2	289 (132)	273 (21)	535 (232)	560 (176)	579 (364)	527 (158)	488 (159)	470 (26)	458 (1)	28 (1)				
t=3	384 (132)	809 (21)	493 (212)	470 (133)	497 (255)	524 (108)	940 (8)	1036 (4)						
t=4	498 (132)	965 (21)	623 (140)	706 (76)	517 (104)	413 (48)								
t=5	947 (100)	1147 (14)	637 (74)	310 (36)										
t=6	1427 (70)	464 (8)												
t=7	2042 (23)	693 (3)												

Note: \* is missing value; the unit is 100 SEK; values in parentheses are the number of students.

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