

# The Effects of Education and Training in Entrepreneurship

*- A long-term study of JA Sweden Alumni labour potential and business  
enterprise*

Karl Wennberg\*

Niklas Elert\*\*

\* [karl.wennberg@ratio.se](mailto:karl.wennberg@ratio.se)

\*\* [niklas.elert@ratio.se](mailto:niklas.elert@ratio.se)



## *Foreword*

In autumn 2011, the Swedish school system underwent a large reform. The new school directive aspires to help students develop skills and approaches that foster entrepreneurship, business enterprise and innovative thinking. Entrepreneurship exists as its own subject and is even included as an upper secondary school degree objective. Students' innate inquisitiveness, power of initiative and self-confidence will be further developed. Being an entrepreneur is all about thinking in new and creative ways, spotting opportunities and solving problems. These characteristics are useful regardless of whether, later in life, one becomes an employee or is self-employed.

For over thirty years, JA Sweden has seen how 250,000 young people have developed these skills through the Junior Achievement Company Programme. Throughout the course of one school year, students get practical experience in the life cycle of a business by starting, running and dismantling a firm with the support of teachers and mentors from the business sector. The abilities to cooperate, solve problems, reach decisions and take responsibility for their own training are developed.

But what exactly does this form of entrepreneurship education provide, and in a long-term perspective, what happens to JA Company Programme students?

This report gives a clear answer. Those who run a firm during their secondary schooling (participated in the Company Programme), later had a better establishment in the labour market, fewer days of unemployment, higher income and more often become managers than the control group. We also see that the JA Company Programme increases the probability of starting a business and that the income of this business is higher than the control group.

Our hope is that readers will embrace the contents herein, which indicate that entrepreneurship training provides positive individual development and economic growth. With their entrepreneurial abilities developed, JA Company Programme students have a stronger labour market establishment and they start more businesses.

This report is compiled by Associate Professor Karl Wennberg and doctoral student Niklas Elert with The Ratio Institute. The authors bear sole responsibility for the contents and conclusions of the report.

Happy reading!

Representative for Junior Achievement Sweden

Pontus Ekstam

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## Table of Contents

1. Introduction.....	4
2. Background - Junior Achievement.....	6
3. Research Findings within Entrepreneurship Education .....	7
4. Data and Method.....	9
5. Results: Class of '94 - Labour market position among JA Sweden Alumni .....	13
Cohort 1994: Mean income from employment .....	13
Cohort 1994: Proportion of managers .....	14
Cohort 1994: Labour Market Establishment.....	15
Cohort 1994: Higher education .....	17
Cohort 1994: Final grades from upper secondary school.....	17
6. Results: Analysis of JA Sweden Alumni firms through matching .....	18
(1) Probability of an individual starting a firm.....	23
(2) Entrepreneurial income.....	24
(3) Firm survival .....	27
7. DISCUSSION AND CONCLUSIONS.....	29
APPENDIX 1 .....	34
APPENDIX 2 .....	35

## List of terms

**Junior Achievement's Company Programme (JACP)** – a Junior Achievement educational programme that gives upper secondary school students the opportunity to start, run and dismantle a firm during a school year.

**JA Sweden alumni** – individuals who have participated in the Company Programme.

**JACP Student** – an upper secondary school student who participates in the training JACP.

## 1. Introduction

The past few years have seen a global explosion of various types of educational and training programmes aimed at stimulating entrepreneurship. Despite an increased research interest in entrepreneurship education and training programmes, the impact of such educational and training efforts is not widely known (Gorman, Hanlon & King, 1997; Kolvereid & Moen, 1997).

Most educational and training efforts cost money; and therefore, governmental authorities need to evaluate whether they should prioritise efforts such as start-up grants or other methods to stimulate entrepreneurship. Specifically, in terms of entrepreneurship, it is important to know whether these educational and training efforts have increased new business creation, and whether these firms have created more jobs or have greater wage and growth productivity than other firms in general.

A recent Dutch field study of entrepreneurship education in upper secondary schools reveals that such education can improve an individual's non-cognitive competencies such as persistence, creativity, and forward-thinking behaviour and that these abilities are best developed at an early age (Rosendahl Huber et al., 2012). Yet on the whole, there is a lack of research that evaluates the *long-term* effects of entrepreneurship education.

In this report, we try to fill the knowledge gap by investigating the effects of Junior Achievement's Company Programme (JACP), a training programme that can be integrated into education at the upper secondary school level in Sweden. Over the course of one school year, upper secondary school students gain practical experience of how to start, run and dismantle a firm. We follow three cohorts that participated in the training programme JACP in the mid-1990s to investigate the long-term effects of JACP on an individual's labour potential. In order to avoid self-selection problems with individuals that voluntarily choose to run a JACP firm in upper secondary school, we use a quasi-experimental approach, Propensity Score Matching (PSM). People who have participated in the training programme JACP *are matched* with similar people who have not run a JACP firm but had, using a number of background variables, the same *probability* of running a JACP firm during upper secondary school.

This method makes it possible for us to pose the hypothetical question:

*If an individual in the mid-1990s was given the opportunity to participate in the training programme JA Company Programme, what were the relative effects on their labour market performance in the long term?*

We have taken a long-term perspective and investigate each individual's labour market activities 11 to 17 years after their leaving upper secondary school. This perspective allows us to follow these JA alumni into their early middle age, which is of particular importance since the probability of starting a company tends to be highest between the age of 35 and 45 years old. (Delmar and Davidsson, 2000).

Descriptive statistics show that on average, JA Sweden Alumni, those students who participated in JACP, have lower unemployment rates, higher income as employees, and are more likely to become a manager, although they have on average lower marks from upper secondary school. A tentative conclusion of this is that the JA Company Programme is a useful way to exercise 'non-cognitive competencies' such as persistence, creativity and forward-thinking behaviour, something which research highlights as significantly important to an individual's chance of success in the labour market (Rosendahl Huber *et al.*, 2012).

The results of our matching method show that participation in the training programme JACP increases an individual's probability of starting a company and that these companies provide higher salaries, even when taking into consideration self-selection to the programme. Having participated in the training programme JACP seems, however, to have only marginal effects on a company's survival. This is in line with earlier studies on "entrepreneurial opportunity costs" (Amit *et al.*, 1995; Wennberg *et al.*, 2010).

In this report, we will first summarize the latest research findings surrounding the relationship between education, training, and entrepreneurship. We establish that to a large degree, there is a lack of studies that systematically investigate the relationship between various types of educational programmes and entrepreneurship. Next, we will describe how statistical databases from Statistics Sweden can be used to investigate the relationship between education, training and entrepreneurship.

The results are divided up into two chapters. First, we investigate a number of broad labour market variables such as income, managerial appointments, unemployment and establishment in the labour market, upper secondary school grades as well as post-upper secondary school grades, and by using these variables we are able to compare JA Sweden Alumni and the rest of the population. We also describe in our assessment how, with the help of PSM, we can correct for the students self-selection to participate in the training programme JACP. Thereafter, using PSM matching, we can investigate more exact statistical estimations of the direct effects of the JA Company Programme for an individual's potential as an entrepreneur 11 to 17 years later, specifically: (1) the probability of an individual starting a business, (2) entrepreneurial income, and (3) firm survival. The report concludes with a discussion of the results that emerge and which conclusions can be drawn from these.

## **2. Background - Junior Achievement**

Junior Achievement Sweden (JA Sweden) is a non-profit, non-political organisation providing education and training in entrepreneurship. JA Sweden's training programme has its roots in Junior Achievement Worldwide (JAW), which was founded in 1919 in the USA and aimed to work together with schools to foster entrepreneurship and promote contact between enterprises and the education system. Today, JAW has 123 member countries and around thirty training programmes in entrepreneurship, workforce readiness and financial literacy. JA Sweden is a part of the European umbrella organisation Junior Achievement – Young Enterprise Europe (JA-YE Europe) supporting 38 European member states. Junior Achievement Sweden was established in 1980.

Through various educational programmes for primary and secondary schools, Junior Achievement Sweden wants to give children and young people the opportunity to train and develop their creativity, entrepreneurship, and their practical business skills. The training programme JA Company Programme is targeted towards upper secondary school students and gives them the opportunity to start, run and dismantle a firm – what is known as a mini companies – in close cooperation with schools and with mentorship from the business world. The idea is that students will experience an entire company's life cycle. A textbook for students and a teacher's guide are available to support both the student and the teacher, and in addition, JA Sweden's 24 regional offices and their employees offer motivational talks, educational seminars and activities for both students and teachers alike.

Over 20,000 students annually run a mini company at one of the 550+ upper secondary schools offering the programme. Of the JACP students, half are enrolled in vocational school programmes and the other half are enrolled in academic preparatory programmes. Since its inception in 1980, 250,000 people have run a JACP firm and are now JA Sweden Alumni. <sup>1</sup>

### 3. Research Findings within Entrepreneurship Education

Many studies show that success as an entrepreneur depends, to a large extent, on earlier experience (Baron & Ensley, 2006; Dencker et al., 2009; Wennberg et al., 2010). These studies point to the importance of entrepreneurs learning from their own earlier entrepreneurial endeavours. Influential entrepreneurship researcher Scott Shane argues that such experience yields important competencies. These may relate to how one organises and finances a new firm and how one employs and directs staff. However, Shane did not explicitly investigate what these competencies were (Shane & Khurana, 2003).

To be an entrepreneur is not a specific career such as a teacher, doctor or solicitor. On the contrary, entrepreneurs operate in all kinds of environments and industries. It is thus difficult to point out exactly which types of knowledge and experiences benefit entrepreneurship in a given context, and whether an individual can profit from the same knowledge in a different context. Researchers therefore usually distinguish between *market knowledge* and *process knowledge*. Market knowledge is the knowledge of how commercial operations function within a specific field or business sector, for example: medicine, food service, or online sales of books. Knowledge of one of these business sectors does not necessarily benefit starting a company in another business sector. Process knowledge, on the other hand, implies that one has learned about the more general processes required for starting and running a company, for example: legal and tax requirements, how to employ and motivate staff, or how to negotiate with customers and suppliers.

Many entrepreneurs use various forms of iterative problem solving. They improvise their way to solutions at an early stage and then attempt to streamline solutions if they prove to be successful. In this way, they develop "routines" or "rules of thumb" for how to handle various problems (Baker & Nelson, 2005; Sarasvathy, 2001). Rules of thumb related to market knowledge (for example, how to organise the logistics of a restaurant) are not necessarily

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<sup>1</sup> [www.ungforetagsamhet.se](http://www.ungforetagsamhet.se)

useful in a different context. But rules of thumb related to process knowledge (for example, how to persuade a doubtful customer to try a new kind of product or service) can be just as beneficial in a new context (Bingham & Eisenhardt, 2011).

Since the majority of all training focuses on conveying market knowledge and not process knowledge, a key issue within entrepreneurial learning remains unanswered: what kinds of *activities* in education, training and professional experience facilitate successful entrepreneurship? According to Landström (1999), the link between modern entrepreneurship research and the entrepreneurship training programmes provided to students is far too weak, with entrepreneurship in many cases being regarded as a "simplified" form of business administration. Garavan and O’Cinneide (1994) compared traditional business education (mainly in the USA and UK) with the economic reality faced by entrepreneurs. They argue that business education is largely based on traditional information and focuses on understanding, feedback, critical judgement and analytic ability to develop predictive models of marketing, finance, organisation, etc. of a firm with a given set of resources. Entrepreneurship, on the other hand, is characterised by scarce resources, intuitive decision-making and interpretations of the goals and aspirations of others (Sarasvathy, 2001). Hence, entrepreneurial decision-making is based not on the traditional information found in business education, but instead on the entrepreneur's ability to inspire confidence for their visions and ideas, and to use the available resources as creatively as possible. Additionally, time shortages and other constraints must frequently be taken into consideration by the entrepreneur. Politis (2005) claims that the ability to "learn entrepreneurship" is conditional on an individual's development of planning, marketing, and negotiation skills, rather than acquiring specific knowledge of a subject. These theoretical lines of reasoning underscore the importance of evaluating practical entrepreneurship training programmes such as the JA Company Programme.

A number of descriptive and multivariate studies indicate that entrepreneurship training programmes at the university level can be valuable (Souitaris, Zerbinati & Al-Laham, A. 2007; Yar et al. 2008). Yet these studies have not been able to statistically control for the fact that there is an evident self-selection to such programmes and training. Perhaps it is the case that entrepreneurially gifted students are the ones that primarily seek enrolment in entrepreneurship training programmes; and as a result, their possible intention to become entrepreneurs, regardless of the quality or structure of the training programme, make it impossible to assess whether the programme has any effect.



The few existing quasi-experimental evaluations that attempted to control for the problem of self-selection have not been able to show that entrepreneurship training programmes are of any value (Oosterbeek, van Praag and Ysselstein, 2010). In a new article, a research group using a randomised field experiment investigated the effects of the entrepreneurship training programme "Bizworld" for the development of competencies relevant to future entrepreneurship (Rosendahl Huber, Sloof & van Praag, 2012). They found that the training programme did not have any effect on cognitive competencies such as calculation or reading comprehension, but did have an effect on non-cognitive competencies, such as persistence, creativity, and forward-thinking behaviour. They judge that these skills are best developed at a young age.

## 4. Data and Method

Our study is unique in its utilisation of public databases that are linked to each other through different levels of analysis. We connect databases with information about individuals to databases with information about the firms that these individuals work in or run.

The data comes from three sources:

At the individual level, we use Statistic Sweden's database LISA, which contains information about all individuals between 16 and 64 years old residing in Sweden. LISA has information about an individual's occupation, housing, and family characteristics as well as detailed information about their education, which is of particular interest to this study.

At the firm level, we use Statistic Sweden's database Enterprises and Employees (FDB by Swedish acronym), which contains all registered firms in Sweden: limited companies as well as trading partnerships and sole-proprietorships. The firm-level information is complemented with information from the tax authorities, which makes it possible for us to study economic activities such as firm turnover and salaries drawn from a firm. Since these databases are longitudinal in nature, we can follow individuals over time. For ethical reasons, our data set has been made anonymous. We can follow individual persons and firms through the data, but we cannot identify them.

The basis for our analysis, and the third source of data for our study, is JA Sweden's anonymous database. When matched with the LISA database, it results in a population of

194,000 people: all who have driven a JACP firm sometime in the years 1980-2007 and can be matched with LISA. This is the target population of our study. We asked Statistics Sweden to match these individuals against the public registry. For security reasons, Statistics Sweden does not give out information about particular individuals, but that has no bearing on the investigation since we are interested in JA Sweden Alumni as a group.

We have chosen not to look at all JA Sweden Alumni, but rather at 3 cohorts that participated in the training programme JACP a relatively long time ago, more precisely all JA Sweden Alumni from 1994, 1995 and 1996, and consider their outcome in 2009-2011. There are several motivations for this selection. First, a more short-term investigation would be hampered by the fact that many young people aged 18-25 are not at the labour market's disposal; they generally pursue military service, higher education, and often spend a year abroad. Our study is therefore designed to take into account the relatively late entry of young Swedish people into the labour market (Erikson, Nordström Skans, Sjögren, and Åslund 2007). Second, the long-data series allows us to follow individuals into their early middle age, which is particularly important since the probability of starting a company, tends to be highest between the ages 35 and 45 years old. (Delmar and Davidsson, 2000). Third, the long "gap" between when "treatment" (participation in JA Company Programme) occurs and the point in time that we measure outcome variables means that we decrease the risk of *endogeneity*, that is, the combined outcomes of both JA Company Programme and outcome variables - which could be the case if, for example, the individual continues to run their JACP firm even after completing their secondary studies.<sup>2</sup> Fourth, matching a large number of individuals requires considerable computing power, which is explained in more detail in the methods section on "matching".

We investigate labour market activities among these three cohorts of JA Sweden Alumni between 15 and 17 years after graduating from upper secondary school. We first investigate labour market activities among cohort 1994 (those who ran a JACP firm during the school year 1993-1994, and the control group from the same year) based upon bivariate statistics of a number of relevant labour market outcomes such as wages, unemployment, workforce establishment, higher education and grades. Next, we investigate JA Sweden Alumni potential as entrepreneurs through PSM matching against the control group. Cohort 1994 has

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<sup>2</sup> It should be pointed out here that according to the training programme JACP, all firms should be dismantled and liquidated as part of the programme. There are some, however, especially of the more successful firms, that are rebuilt and resume running directly after graduation.

been chosen because it gives us access to a follow-up period long enough for the individuals to reach an age of 35-45 years old, the period where the probability of starting a company is highest (Delmar & Davidsson, 2000). Specifically, we investigate the differences in wages from employment between JA Sweden Alumni and the control group, differences in the probability of reaching a managerial position, differences of "establishment in the labour market", differences in the probability of starting and finishing a university programme, and finally, differences in grades from upper secondary school. We discover that JA Sweden Alumni 1994 have a better outcome of the same variables with the exception of grades from upper secondary school.

The population studied consists of the individuals that graduated from secondary school between 1994 and 1996, meaning three separate year groups of secondary school students. It is possible for individuals to appear in more than one year group in the database. In these cases, we have chosen to define the individual's final graduating year as their actual cohort affiliation.

Table 1 shows how many people are included in each cohort and JA Company Programme, divided by gender. As you can see, JA Company Programme participation is fairly evenly distributed across gender. In all, 4.6 percent of men and 4.4 percent of women in the cohorts are JA Sweden Alumni.

*Table 1: Number of people by cohort, gender and JACP participation, 1994-1996*

Cohort	Men		Women		Total		Total
	Non-alumni	Alumni	Non-alumni	Alumni	Non-alumni	Alumni	
1994	40,788	1,208	36,433	1,150	77,221	2,358	79,579
1995	29,999	1,301	32,311	1,350	62,310	2,651	64,961
1996	38,113	2,700	37,091	2,394	75,204	5,094	80,298
Total	108,900	5,209	105,835	4,894	214,735	10,103	224,838

Table 2 shows how large a fraction of students already ran their own firms in the year of their graduation. With the exception of women in cohort 1995, where this was more common among NON- JA Company Programme participants.

*Table 2: Percentage of business owners by cohort, gender and participation in JACP, 1994-1996*

Cohort	Men		Women		Total		Total
	Non-alumni	Alumni	Non-alumni	Alumni	Non-alumni	Alumni	
1994	1.63%	1.90%	0.77%	1.13%	1.22%	1.53%	1.23%
1995	1.71%	2.54%	0.91%	0.74%	1.30%	1.62%	1.31%
1996	1.73%	1.93%	0.84%	1.13%	1.29%	1.55%	1.30%
Total	1.69%	2.07%	0.83%	1.02%	1.27%	1.56%	1.28%

We wish to evaluate individuals' probabilities of becoming new business owners 11-13 years post-graduation, thus the probability for individuals in the three cohorts to become new business owners between 2005 and 2007. The original cohorts are corrected for people who moved abroad or for some other reason disappeared from the registry of the total population (RTB) since graduating from secondary school. For example, individuals in cohort 1994 must be present in RTB years 2004 and 2005 in order to be included in the sample population. Table 3 shows descriptive statistics for cohorts 11 years post-graduation, that is, in 2005-2007.

*Table 3: Descriptive statistics for cohorts 11 years post-graduation (2005-2007)*

	Mean value	SD	Min	Max
Started a new business in current year	1.2%	10.9	0	100
JA Sweden Alumni	4.5%	20.7	0	100
Woman	49.2%	50.0	0	100
Over age 20	2.7%	16.1	0	100
Business administration	14.1%	34.8	0	100
2nd generation immigrant	3.9%	19.4	0	100
1st generation immigrant	5.6%	23.0	0	100
Parent business owner	39.7%	48.9	0	100
Academics home	7.7%	26.7	0	100
Grade, inflation-adjusted	20.4	11.5	1	40
Higher education	39.8%	48.9	0	100
Studied in autumn	14.4%	35.1	0	100
Unemployed	16.0%	36.7	0	100
Married or de facto	36.4%	48.1	0	100

*Note:* All variables besides grades measure as dummy variables. SD= standard deviation. N=224,838.

Table 4 shows the same statistics divided up by whether individuals are JA Sweden Alumni or not. We can observe that those who ran a JACP firm to a greater extent studied business administration in upper secondary school, and to a larger extent have parents who are or were

business owners. Furthermore, it can be observed that more men, more people who finished secondary school early, and fewer individuals with immigrant background participated in the JA Company Programme. The only variables with no statistically significant difference (at the 5 percent level of statistical significance) between the two groups were the percentage of women and the percentage of married or de facto people.

*Table 4: Mean values by percentage for JA Sweden Alumni and Non-alumni*

Variables	Mean value, percent		P-value*
	Alumni	Non-alumni	
Number	10,103	214,735	
Started new business (D)	1.49	1.19	0.007
Woman (D)	48.44	49.29	0.097
Over age 20 (D)	1.91	2.71	0
Business administration (D)	56.29	12.14	0
2nd generation immigrant (D)	3.24	3.93	0
1st generation immigrant (D)	4.72	5.64	0
Parent business owner (D)	44.01	39.48	0
Academics home (D)	5.37	7.84	0
Grade, inflation-adjusted	19.28	20.42	0
Higher education (D)	34.89	40.02	0
Studied in autumn (D)	12.2	14.54	0
Unemployed (D)	14.95	16.06	0.003
Married or de facto (D)	35.81	36.41	0.219

*Note:* D=dummy variable; \* indicates p-value from t-test. N=224,838.

## 5. Results: Class of '94 - Labour market position among JA Sweden Alumni

In the following descriptive statistics, we will focus on the first cohort, meaning the 2,358 individuals that participated and ran a JACP firm in the 1993-94 school year, and the 77,221 in the control group for the same academic year. We have done it like this as a clear and simple way to show how a specific year group of individuals divided into two groups those who participated in JACP and those who did not, developed during the first 15 years after graduation, i.e. up until 2010.

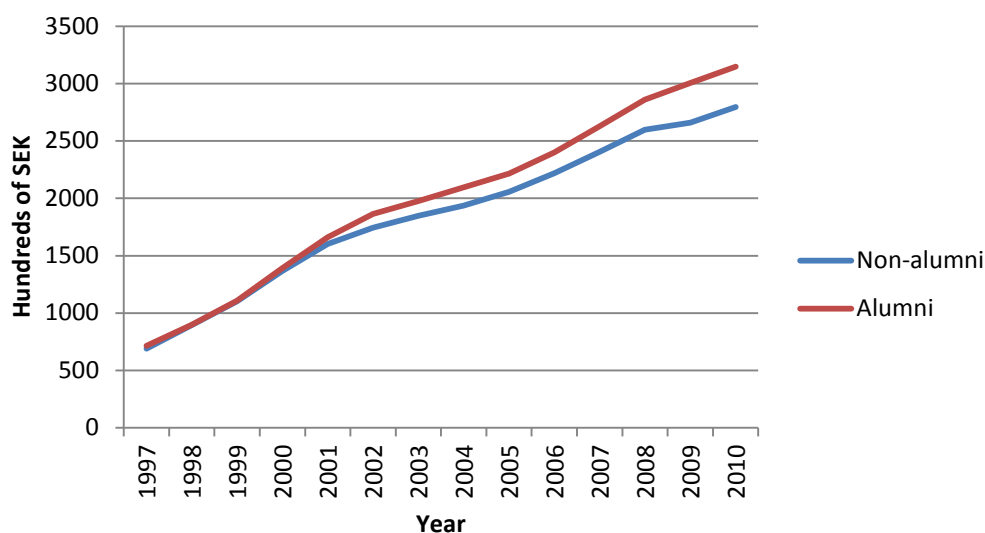
### Cohort 1994: Mean income from employment

One central variable in labour market research is an individual's salary. Salary can be viewed as a function of an individual's human capital (education, training, and professional experience) (Becker, 1965). If employers value the experience of an education through the

training programme JACP, it is therefore an indication that there is a systematic component to the educational programme that has value to the labour market even beyond the starting and running of a firm. For that reason, we investigate mean income 3-15 years after graduation for both JA Sweden Alumni 1994 and the control group.

Figure 1 shows that JA Sweden Alumni had, on average, 35,700 Swedish kronor (SEK), or *twelve percent more annual income than the control group in 2010*. In other words, there is a difference of more than an average monthly salary, which says much. It is also clear that the difference becomes greater over time.

Figure 1: Mean income in hundreds of Swedish kronor (SEK), 3-16 years post-graduation.



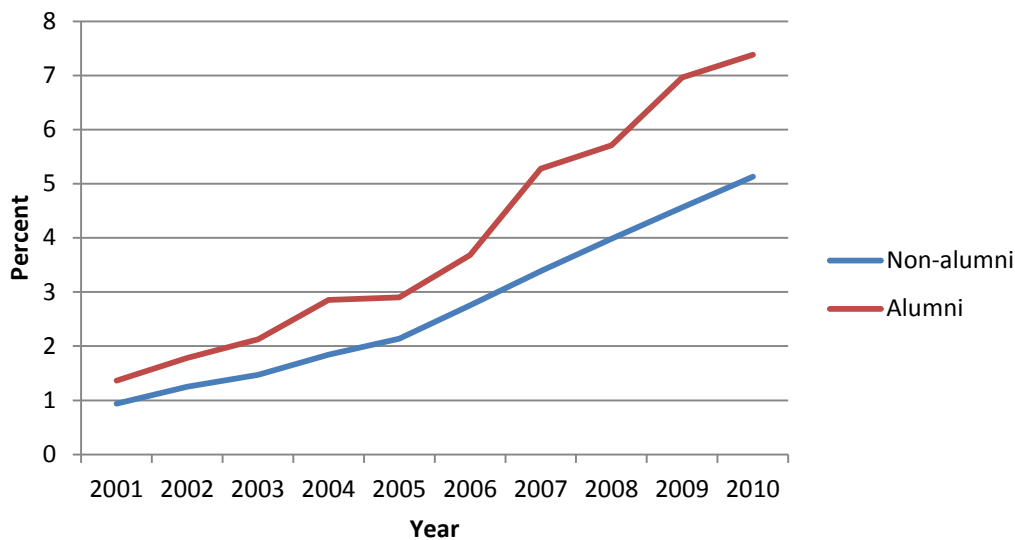
## Cohort 1994: Proportion of managers

Beyond the actual outcome of starting a firm, the training programme JACP also involves training in teamwork, management techniques and leadership. Another potentially important measure of an individual's strength in the labour market is their ability to obtain senior positions.

In Figure 2 below, we show the proportion of managers (defined according to Statistics Sweden's standardised work codes, SSYK) among JA Sweden Alumni and the control group 7-16 years after upper secondary school graduation. It is clear that JA Sweden Alumni are, to a much greater extent, able to obtain manager positions, which indicates that the training programme JACP is relevant to professional life in a broader sense. 7.38 percent of JA Sweden Alumni were managers 16 years after secondary school, while the corresponding

number for the control group was 5.12 percent. *In other words, JA Sweden Alumni had a 44 percent higher probability of becoming managers than the control group.* This supports the results from Rosenthal Huber et al. (2012) that entrepreneurship training programmes and comparable educational programmes at an early age can positively influence non-cognitive competencies, such as persistence, creativity, and forward-thinking behaviour.

Figure 2: Proportion of managers by percentage, 7-16 years post-graduation.



## Cohort 1994: Labour Market Establishment

We also investigate the percentage of "weakly established" individuals in the labour market among both JA Sweden Alumni 1994 and the control group. The level of the workforce establishment is a measurement developed by Statistics Sweden's Register Based Activity Statistics (RAKS by Swedish acronym) used to evaluate the progress of individuals and groups in a society (Andersson and Gullberg Brännström, 2009). Income levels are to a large degree governed by gender, age and education level. For this reason, Statistics Sweden has chosen to use a method based on the "alternative income principle" to calculate a limit that is always changing over time. If a person has an income that falls below this limit, that person is defined as "weakly established" in the labour market (see further Andersson and Gullberg Brännström, 2009). We investigate individuals' establishment in the labour market 8-15 years after graduating from secondary school, since RAKS is only present from 2003 onward. Figure 3 shows that seen over this entire time period, the proportion of those who are weakly established in the labour market is lower among JA Sweden Alumni than in the control group. One exception is the year 2007, where there is no noticeable difference between the two groups. A possible explanation for this is that since unemployment was low in this year,

"borderline" groups benefited, regardless of background. In the year 2010, 9.6 percent of JA Sweden Alumni were weakly established, compared to 11.9 percent of the control group. *The probability of a weak establishment was therefore 12 percent lower among those who participated in the training programme JA Company Programme.*

Figure 3: Proportion of the weakly established in the labour market, 8-15 years post-graduation.

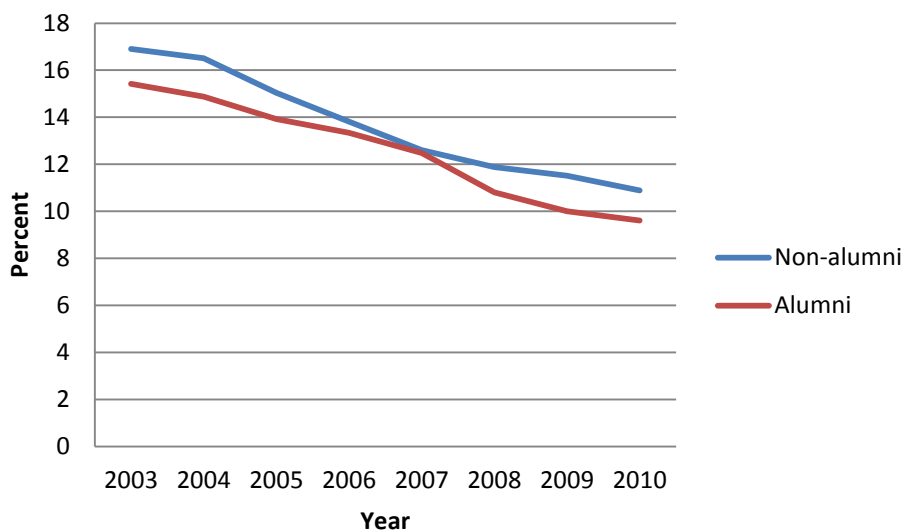
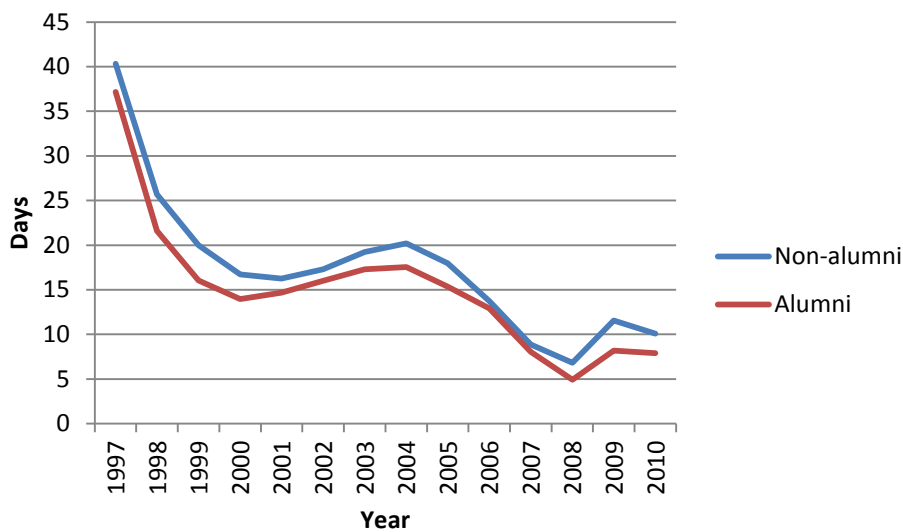


Figure 4 shows that if we use the measurement "number of days unemployed" instead of establishment in the labour market, we find a similar pattern: the mean number of unemployed days is lower for JA Sweden Alumni than for the control group, again with the exception of 2007. In 2010, the mean number of unemployed days for JA Sweden Alumni (7.91) was clearly lower than the mean number of unemployed days for the control group (10.07) and differed significantly on the 1% level. *JA Sweden Alumni therefore had just over a 20 percent lower probability of being unemployed than the control group.*



Figure 4: Proportion of unemployed days, 3-15 years post-graduation.



### Cohort 1994: Higher education

If we instead compare higher level studies between JA Sweden Alumni and the control group, Table 5 shows that alumni begin university level programmes to a greater extent than the control group: 60.7% of JA Sweden Alumni do this, compared to 55.7% of the control group. However, the differences are less when it comes to finishing university programmes, 41.1% compared to 40.3%.

Table 5: Percentage of JA Sweden Alumni and control group that began/finished university programmes.

	JA Sweden Alumni	Control group
Began post-secondary programmes	60.70 %	55.70 %
Finished post-secondary programmes	41.10 %	40.30 %

### Cohort 1994: Final grades from upper secondary school

When it comes to final grades from upper secondary school, Table 6 shows that JA Sweden Alumni had somewhat lower average grades than the control group: 3.31% to 3.24% on the five point grading scale. The difference is small yet statistically significant at the 5% level.

*Table 6: Average upper secondary school grades for JA Sweden Alumni and control group.*

	Alumni	Non-alumni
Grade	3.21	3.24

## 6. Results: Analysis of JA Sweden Alumni firms through matching

In the descriptive tables and figures prior to this section, interesting patterns have emerged regarding labour market activities and outcomes between JA Sweden Alumni and the normal population. There are, however, limitations to simply comparing JA Sweden Alumni with the rest of the population in this manner. More specifically, a simple comparison does not enable us to say whether "more entrepreneurial" individuals voluntarily choose to participate in the JA Company Programme during their secondary school years. Consequently, it is impossible to comment on whether the JA Company Programme has a positive impact on an individual's entrepreneurial ability.

Thus, we present here a more inclusive statistical analysis of entrepreneurship outcomes where we try to deal with any potential problems of comparing the outcomes of those who participated in the JA Company Programme and those who did not.

This analysis is divided into three parts:

- First, we investigate the effect of participation in the JA Company Programme on the propensity to start new businesses later in life.
- Second, we investigate the effect of participation in the JA Company Programme on entrepreneurial income, provided that one started a firm later.
- Finally, we have a look at how participation in the JA Company Programme influences the survival rate of firms that are started later in life.

In all these cases we use what is known as a matching procedure, with the aim of matching JA Sweden Alumni with comparable people who are not JA Sweden Alumni to be able to make a correct inference. We also investigate the stability of our results with the help of a

Monte Carlo analysis, a commonly used method for demonstrating underlying selection characteristics within econometrics.

## Matching – procedure and method

The stark difference in background variables seen in Table 4 above suggest that a self-selection mechanism might be operating in which individuals chose to participate in the training programme JACP. The individuals that chose to take part in the training programme differ in important ways from the rest of the population, and these differences could have influenced their decision to run a JACP firm. This means that we cannot simply assume that the different outcomes between the two groups depends on whether they are JA Sweden Alumni or not, if in the spirit of experimentation we consider participation in the JA Company Programme as a "treatment". Our problem is that we cannot observe both the treated outcome,  $Y_1$ , and the untreated outcome,  $Y_0$ , for any particular individual. Among the treated ( $D=1$ ) we can observe  $Y_0$ , and among the untreated ( $D=0$ ) we cannot observe  $Y_1$ . Our aim is to estimate what is called the *treatment effect on the treated* (TT),

$$TT = E(Y_1|D = 1) - (Y_0|D = 1) = E([Y_1 - Y_0|D = 1])$$

In reality, it is only possible to construct the first term on the right-hand side, as the second term is not directly observable. To simply compare the outcome for the treated and the untreated would be easy, but it would not give a reliable result (Angrist 1998). We would get the following expression:

$$E([Y_1|D = 1] - E[Y_0|D = 0]) = E([Y_1 - Y_0|D = 1]) + \{E([Y_0|D = 1]) - E([Y_0|D = 0])\},$$

which yields the desired TT plus an error term dependent on whether an individual voluntarily chooses to participate in the "treatment" or not – what is known as "self-selection". This is a recurring problem within social science research. Ideally, we would like to run a controlled experiment where the researchers randomly treat some individuals and randomly deny other individuals the treatment. It would thus be possible to compare treatment and control groups created by chance, and it would be easier to comment on the effects of having participated in the training programme JACP. In our case, individuals have not randomly been assigned to participate in the training programme, but have voluntarily

chosen to participate. Because of this, there is a large risk that direct comparisons can be misleading (Rosenbaum and Rubin 1983, p. 42).

A common way to handle this problem is to use some form of matching estimator. The method we employ, *propensity score matching* (PSM), was developed in a series of articles by Rosenbaum and Rubin (1983,1984,1985) and is a widely applied method. A *propensity score* is the probability that an individual, conditional on a series of observable covariates, or characteristics, belongs to the treatment group. The matching in our study involves matching people who *did not participate* in the training programme JACP with people who *did participate* and who have the same probability of being treated, based on a number of observable characteristics such as those in Tables 3 and 4. The intuitive feeling behind the method is that the two groups with the same probability of treatment will appear in the treated and untreated samples in the same proportion (Angrist and Pischke 2008, p. 60). The algorithm behind PSM matches which individuals are the most relevant by taking into account all their characteristics at once. Expressed in the same manner as above, this means that the expression for TT is modified by making it conditional on the *propensity score* (P(X)),

$$E\{E(Y_1|P(X), D = 1) - E(Y_0| P(X), D = 1) |D = 1\},$$

where the factor that we condition upon, P(X), is supposed to remove the bias due to self-selection. In practice, the method means that we find a "twin" for each individual that has participated in the training programme JACP. The more identical these people are with respect to characteristics that affected the probability of participating in the training programme JACP, the less of a problem there will be as regards self-selection in the estimation results. One drawback of PSM is that it can only be based on observable characteristics, in our case, the variables that are available in Statistics Sweden's database. It is important to remember that there may also be other variables, known as unobservable heterogeneity, which can influence the results (Deheja and Wahba 1999, p. 1061).

PSM occurs in several steps. In the first step, we run a regression analysis of the treatment variable, in our case JACP participation, on a set of relevant characteristics in order to estimate a propensity score. This is normally done with the help of some type of parametric regression model, such as a logit or probit model. A growing body of empirical literature indicates that a logistic model works well in practice (Angrist and Pischke 2008, p. 61). A

logistic model is usually employed when one wishes to investigate the correlation between defining variables and a dependent variable that can only assume two possible values.

We estimate the following probabilities of having participated in the training programme JACP given observable characteristics. The results from the model are presented in Table 7. As can be seen, only some of the variables presented in Table 4 are included in the regression. The reason for this is that the model has what is known as a balance requirement. After performing the logit estimation, the algorithm behind the model divides the observations into blocks, or intervals, based on their estimated *propensity score*. Within each interval, a t-test is implemented to determine whether mean values differ in the estimations for the treated group and the untreated, or control group. If the test reveals significant differences in an interval, it is divided in half and followed by a new test, until no interval with a significant difference between the treatment and control groups remains. At this point, there is a test within each interval to ensure that there is no significant difference between the averages of all characteristics, and if there is not, then the balance requirement is fulfilled. This is the reason that so few background characteristics are included in the regression model in Table 7. The balance requirement is not fulfilled if, for example, parents' educational background and parent business owner status are included in the model at the same time. There is one drawback to our research design that should be kept in mind when interpreting our results.

The results are presented in the form of what are called odds ratios. These ratios show the multiplicative effect of a given characteristic on the probability of participating in the training programme JA Company Programme. An odds ratio  $< 1$  means that the variable in question has a negative effect, while an odds ratio  $> 1$  indicates a positive effect. We consequently find that women, older students and immigrants had a lower probability of participating in the training programme, while individuals enrolled in a business administration academic programme or belonging to one of the later cohorts had a greater probability of participating.

Table 7: Probability of participation in JACP for all cohorts 1994-1996.

	Logit model	
Woman (D)	0.87***	(-6.18)
Over age 20 (D)	0.77***	(-3.36)
Business administration (D)	13.3***	(117.28)
2nd generation immigrant (D)	0.64***	(-7.35)
1st generation immigrant (D)	0.71***	(-6.53)
Cohort 1994	1	
Cohort 1995	1.57***	(15.23)
Cohort 1996	4.17***	(53.13)
Observations	224,838	
Pseudo R2	0.166	

Note: Odds quotas with t-values in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 1 in Appendix 1 shows how observations are distributed among intervals when the balancing requirement is fulfilled. We observe that the spread of the probability of participation in the training programme JACP is relatively limited and ranges from 0 to 30 percent probability. To construct the control group we employ what is known as "nearest neighbour" matching. The logic is as follows: Let  $Y_{1i}$  and  $Y_{0i}$  be the observed outcomes for the treated and non-treated. Call  $C(i)$  the number of control units matched to the treated unit  $i$  with an estimated propensity score  $p_i$ . "Nearest neighbour method" means that

$$C(i) = \min ||p_i - p_j||$$

But since an observation often has several "nearest neighbours", a chance algorithm decides which among those are drawn into the control group. We employ what is called 1-to-1-matching. The control group becomes identical in size to the count of individuals who have participated in the training programme JACP<sup>3</sup>.

<sup>3</sup> It is possible to use something other than 1-to-1-matching. The drawback with 1-to-1-matching is that it is not permitted to use the command "no replacement". This means that once an individual in the control group has been selected, this individual can once again be returned to the control group and selected again as the "nearest neighbour".

### (1) Probability of an individual starting a firm

The next step, on the basis of the matching, is to examine how the effect of having participated in the training programme influences the probability of an individual starting a new business 11 years later. Therefore, we include other control variables that could not be included in the matching model, namely individual background characteristics at time  $t+10$ . Table 8 shows the results from two logit estimates based on the matching results, but with somewhat different specifications, and a control estimate where we do not employ matching, but simply use a standard logistic model and thus include all observations. Once again, all results are presented in terms of odds ratios.

We find that the JA Company Programme increases the probability of becoming a new business owner by 24 percent in the logistic model. The effect is somewhat larger in both PSM models, even if the results also become less significant. These findings are somewhat surprising, since it would have been reasonable to assume that self-selection into the JA Company Programme would be such that individuals with greater ability to start businesses participated in the training programme, what is known as *selection on ability*. In that case, results that did not take matching into account should have an *upward bias*. On the contrary, they now seem to have a *downward bias*.

Table 8: Entrepreneurs 11 years post-graduation. Cohorts 1994-1996.

	Logit		PSM Model 1		PSM Model 2	
JACP (treatment)	1.24**	(2.39)	1.33**	(2.28)	1.26*	(1.85)
Woman (D)	0.56***	(-13.40)	0.55***	(-4.50)	0.56***	(-4.31)
Over age 20 (D)	1.33***	(2.73)	1.07	(0.15)	1.02	(0.04)
Business administration (D)	0.83***	(-2.93)	0.79*	(-1.67)	0.79*	(-1.72)
2nd generation immigrant (D)	1.09	(0.91)	0.97	(-0.09)	1.02	(0.06)
1st generation immigrant (D)	1.48***	(4.99)	1.30	(0.99)	1.61*	(1.75)
Cohort 1994	(base category, not shown)					
Cohort 1995	1.14***	(2.59)	1.18	(0.90)	1.17	(0.84)
Cohort 1996	1.08	(1.53)	1.14	(0.73)	1.13	(0.70)
Parent business owner (D)	1.58***	(11.57)			1.83***	(4.73)
Academics home (D)	1.22***	(2.79)			1.35	(1.29)
Grade, inflation-adjusted	1.01***	(5.68)			1.01	(1.41)
Post-secondary degree (D)	0.62***	(-9.49)			0.67**	(-2.53)
Studied in autumn (D)	0.99	(-0.15)			1.22	(1.09)
Unemployed (D)	1.29***	(5.15)			1.20	(1.11)
Married (D)	1.11***	(2.60)			1.20	(1.41)
Control industry	YES		No		YES	
Observations	224,620		20,206		20,177	
Pseudo R2	0.076		0.012		0.064	

Note: Odds quotas with t-values within parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

In order to study whether there is a bias in a particular matching result generated by the chance algorithm, we carry out an evaluation by using what is called a Monte Carlo simulation. This supports the results seen in Table 8 above. In summary, our analysis suggests that the JA Company Programme actually does have a positive effect on an individual's later tendency to start a firm by what looks to be at least 20 percent.

## (2) Entrepreneurial income

When we study the effects of the JA Company Programme on entrepreneurial income, we choose not to study those who became new business owners in 2005 and their entrepreneurial income from the first year. The reason for this is that the database does not inform us of when during the year they became firm owners. By extension, this means that individuals are only firm owners in the month of November. We choose instead to examine only the individuals who were entrepreneurs in the years 2006 and 2007.



We summarise incomes from the firms for which the individuals have prepared tax returns, which means that they were either owners in incorporated firms or partnerships, or are sole proprietors. Table 9 shows total entrepreneurial incomes, divided by gender and JA Company Programme participation. As can be seen, the minimum income values are highly negative. This is likely due to the fact that entrepreneurs sometimes see great losses. In Sweden, losses can be deducted in 1-5 years against wage income. Even so, we remove all observations with negative values in the following PSM estimations. We can see in the table how the difference in mean annual salary between JA Sweden Alumni and the control group is about 10,000 SEK. The difference is smaller, however, among men than among women. This may be because there are more women who run their firm part-time (Folta, Delmar & Wennberg, 2010).

*Table 9: Firm income 2006 and 2007, divided up by JACP participation and gender*

	NOTE:	Mean income	Min	Max
Total Non-alumni	17,937	190,984	-10,600,000	1,991,200
Total Alumni	1,021	201,156	-4,557,495	2,126,000
Men Non-alumni	12,840	218,469	-3,439,972	1,991,200
Men Alumni	750	222,415	-4,557,495	2,126,000
Women Non-alumni	5,097	121,746	-10,600,000	1,349,626
Women Alumni	271	142,324	-1,017,745	1,908,750

Since the sample population this time consists of individuals in cohorts that actually were firm owners in 2006 and 2007, the PSM procedure must be redone. Table 10 shows the results from the logistic model which best fulfils the balancing requirement. This time, even fewer variables are included in the model, but the variables that are included affect the probability of participating in the JA Company Programme in the same way as in the earlier matching model in Table 7, excluding the age-variable which had a negative influence earlier but is no longer statistically significant.

Table 10: Probability of participating in the JA Company Programme. Cohorts 1994-1996.

	Model 1	
Woman (D)	0.81***	(-2.79)
Over age 20 (D)	1.11	(0.52)
Business administration (D)	10.7***	(32.88)
Swedish background (D)	1.50***	(3.46)
Cohort 1995	1.81***	(6.32)
Cohort 1996	4.84***	(18.34)
Observations	18,958	
Pseudo R2	0.144	

Note: Odds-quotas with t-values within parentheses.

\* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01

Once again, we use the estimated propensity score values from the regression in Table 10 to carry out our matching. Table 11 shows the results from the regressions with logarithmic entrepreneurial income as the dependent variable. The two PSM estimates are based on the matching results yet with somewhat different specifications, and for the control estimates only a traditional OLS model is used, thus including all observations. Once again, all results are presented in terms of odds ratios. Since the dependent variable is logarithmic, coefficients multiplied by 100 can now be interpreted as the percentage of change in income for a device search of an independent variable. We find that participation in the training programme JA Company Programme increases an individual's expected income from their firm by 7 percent in the traditional OLS model, but that the increase can be as high as 17-18 percent in the PSM model. Just as with the tendency to start a firm, the results are somewhat surprising since it would have been reasonable to assume that self-selection into the JA Company Programme would be a *selection on ability*, so that individuals who were better at running a firm also chose to run a JACP firm in upper secondary school. If that were so, one would expect that the results that did not take matching into effect would be overestimated. Yet this is not the case. In summary, Table 11 indicates that the JA Company Programme is suggested to have a positive impact on entrepreneurial income later in life by between 7 and 18 percent.

Table 11: Dependent variable: logarithmic income 2006 and/or 2007.

	OLS		PSM Model 1		PSM Model 2	
JACP (treatment)	0.07**	(2.09)	0.18***	(3.63)	0.17***	(3.55)
Woman (D)	-0.40***	(-19.02)	-0.57***	(-8.67)	-0.41***	(-6.25)
Over age 20 (D)	-0.01	(-0.23)	0.31***	(2.75)	0.23**	(2.10)
Business administration (D)	0.02	(0.86)	0.09	(1.59)	0.03	(0.52)
Swedish background (D)	0.02	(0.76)	0.25**	(2.55)	0.13	(1.25)
Cohort 1995	-0.01	(-0.56)	-0.04	(-0.54)	-0.00	(-0.01)
Cohort 1996	-0.08***	(-3.99)	-0.19***	(-2.71)	-0.11*	(-1.75)
Year 2007	0.07***	(4.87)	0.06	(1.26)	0.02	(0.44)
Parent business owner (D)	0.01	(0.80)			0.04	(0.78)
Academics home (D)	-0.10***	(-2.91)			-0.03	(-0.34)
Grade, inflation-adjusted	0.01***	(7.54)			0.01***	(3.13)
Higher education (D)	-0.07***	(-2.68)			-0.04	(-0.43)
Married or de facto (D)	0.00	(0.15)			-0.08	(-1.12)
Number of children	-0.02	(-1.46)			0.06	(1.40)
Studied in autumn (D)	-0.68***	(-14.74)			-1.03***	(-7.03)
Unemployed (D)	-0.42***	(-13.60)			-0.43***	(-4.78)
Close companies (D)	0.70***	(45.65)			0.58***	(11.73)
Industry controls	YES	-	NO	-	YES	-
Constant	11.5***	(258.81)	11.7***	(91.76)	11.2***	(65.43)
Observations	17,836	-	1,910	-	1,910	-
R2	0.22	-	0.07	-	0.23	-

Note: t-value within parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

### (3) Firm survival

As a final step in our analysis, we investigate whether participation in the training programme JACP impacts firm survival rate. In Table 12, we compare the survival rate of firms started by JA Sweden Alumni with that of firms in general. The survival rate in both cases follows a familiar pattern, in that it falls sharply in the first year and thereafter levels out.

Table 12: Percentage of entrepreneurs who remain entrepreneurs. Base year 2005.

Year Group	2005	2006	2007	2008	2009	2010
Alumni	100%	69.1%	56.2%	46.4%	39.7%	34.0%
Non-alumni	100%	66.7%	51.6%	42.2%	36.1%	31.6%

Note: Both Table 12 and Figure 5 below show the survival rate for firms started in 2005 by all three cohorts of JACP Alumni (n=140) and the control group (n=2,339).

Figure 5 shows the same pattern as Table 12 but presented as a graph, where the curve shows the survival of a firm started in 2005 by JA Sweden Alumni or the control group. We see in the figure that after three years, 46.4% of the firms started by people with experience from JA Company Programme remain, compared to 42.2% of firms among the control group. After five years, the numbers are 34.0% and 31.6%.

*Figure 5: Survival of firms started by JACP Alumni 1994-1996 and the control group*

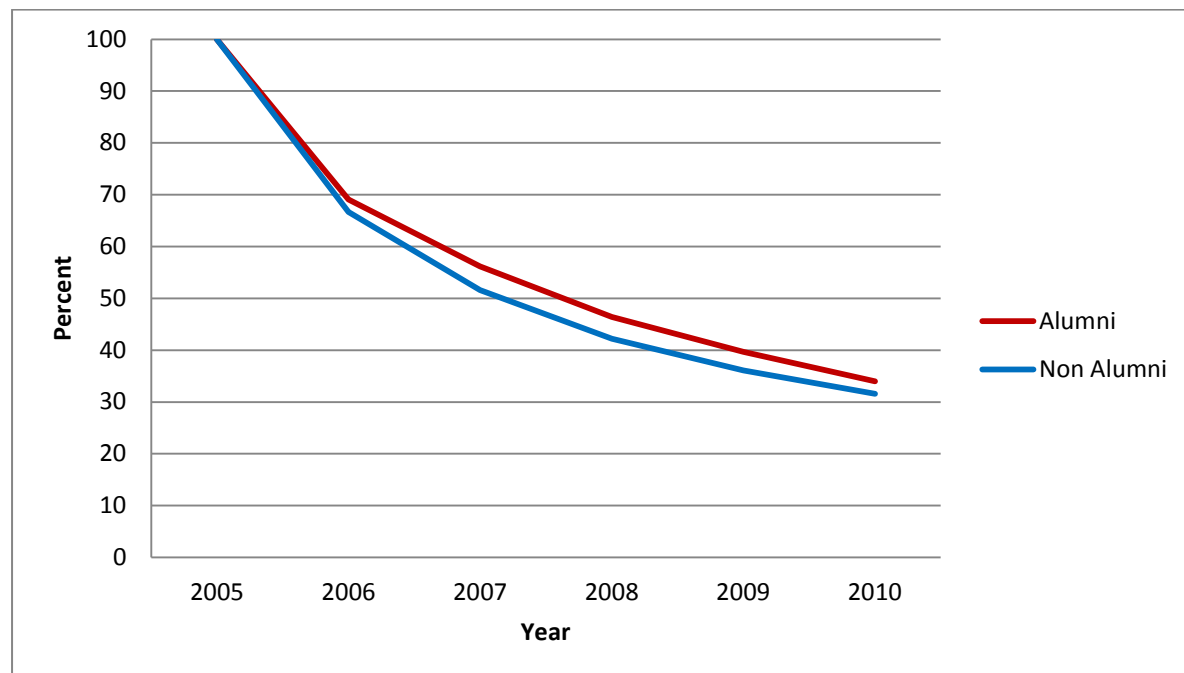


Table 13 below shows the results from a logistic model and a cloglog model where the dependent variable is firm survival. It is coded 0 if the firm is active and 1 in the year the firm ceases to exist in RAMS. We can observe that participation in the training programme JACP is not suggested to have any significant effect on firm survival, even though the results point in the right direction. These results are actually not particularly surprising if one sets them in relation to what we know about the good labour market outcome of JA Sweden Alumni and considers the alternative costs of running a firm (Wennberg, 2009). These alternative costs are higher for JA Sweden Alumni, given their higher probability of attaining a good salary and managerial position as an employee as compared to the control group. Accordingly, they have a somewhat greater tendency than the control group to shut down their firms, despite the firms being more successful than those of the control group. This type of dynamic in the business sector and in the labour market is seen overall by economics researchers as positive for the national economy as a whole (e.g. Audretsch, 1995).

Table 13: Logistic model: Dependent variable is survival of an individual's firm

	Logit		Cloglog	
JACP (treatment)	-0.16	(-1.09)	-0.13	(-1.00)
Woman (D)	0.36***	(4.93)	0.31***	(4.92)
2nd generation immigrant (D)	0.08	(0.53)	0.08	(0.59)
1st generation immigrant (D)	0.09	(0.79)	0.07	(0.68)
Business administration (D)	0.11	(1.36)	0.08	(1.21)
Close companies (D)	-0.12*	(-1.69)	-0.10*	(-1.69)
Post-secondary education	0.28***	(3.35)	0.24***	(3.35)
Grade, inflation-adjusted	-0.01***	(-2.77)	-0.01***	(-2.82)
Children (D)	-0.08	(-1.29)	-0.08	(-1.41)
Year group 2006	1	-	1	-
Year group 2007	-0.47***	(-4.29)	-0.40***	(-4.37)
Year group 2008	-0.83***	(-7.39)	-0.72***	(-7.56)
Year group 2009	-1.11***	(-9.13)	-0.99***	(-9.38)
Year 2010	-1.29***	(-10.15)	-1.16***	(-10.35)
Cohort 1994	1	-	1	-
Cohort 1995	0.11	(1.25)	0.10	(1.33)
Cohort 1996	0.42***	(4.39)	0.39***	(4.64)
Mining, manufacturing	1	-	1	-
Low-tech manufacturing	-1.56***	(-7.08)	-1.36***	(-7.19)
High-tech manufacturing	-0.86***	(-4.52)	-0.70***	(-4.51)
Electricity, construction	-1.32***	(-7.27)	-1.14***	(-7.67)
Wholesale, retail, hotel, restaurant	-0.75***	(-4.52)	-0.62***	(-4.75)
Transport, communication, finance	-0.85***	(-5.22)	-0.70***	(-5.60)
Real estate, computer service	0.61**	(2.28)	0.44**	(2.46)
Education, health, etc.	-0.56**	(-2.27)	-0.42**	(-2.12)
Other services	-0.97***	(-5.95)	-0.81***	(-6.43)
Constant	0.18	(1.03)	-0.17	(-1.21)
Observations	7,073		7,073	
Pseudo R2	0.061			

*Note:* Industries 3 and 10 are excluded since the number of dismantled firms is too low to be estimated. Total of 25 observations. t-value within parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01

## 7. DISCUSSION AND CONCLUSIONS

The foundation for this report was the existing knowledge gap regarding the effects of education and training programmes aimed at fostering entrepreneurship (Gorman, Hanlon & King, 1997). Since the costs for different training programmes can be high, it is necessary to properly evaluate the benefits of financing them. This report is one attempt at such an evaluation. We examined the upper secondary school students that in the mid-1990s

participated in Junior Achievement Sweden's training programme JA Company Programme – known as JA Sweden Alumni – and tracked these individuals up to 17 years later in order to study their position in the labour market. We compared the number of labour market relevant variables with a control group of all upper secondary school students from the same year that did not participate in the programme JACP.

By looking at different labour market outcomes, we discover that sixteen years after graduation from upper secondary school, JA Sweden Alumni earn a month's wages more in annual salary than the control group, have around 40 percent greater likelihood of becoming a manager, and 20 percent lower likelihood of being unemployed. Despite alumni having somewhat lower final grades from upper secondary school, they both began and finished university programmes to a greater extent than the control group. This suggests that the societal return of entrepreneurship training at the secondary school level, such as with the training programme JA Company Programme, is very high. To our knowledge, there are few similar programmes that can demonstrate such strong effects on higher income from employment and such lower the likelihood of being unemployed.

These results, however, represent the average effects and are based on descriptive statistics. The primary goal of the training programme JA Company Programme is, as previously described, to learn how to start and run a firm, and it is therefore of particular importance to investigate the long-term effects of the training programme on an individual's ability to start and run a firm. In order to avoid the problem of self-selection which occurs by individuals voluntarily choosing to participate or not in the training programme JACP, we then employed a quasi-experimental design to more specifically examine entrepreneurship potential among JA Sweden Alumni, thus, what the program is primarily intended to promote. We could then show that participation in the JA Company Programme increases the probability of an individual starting a firm later in life by at least 20 percent, and increases an individual's expected entrepreneurial income by between 7 and 12 percent compared to those who started a firm in the control group. Compared with the other factors that the research found, the likelihood of becoming an entrepreneur and the likelihood that the firm does well both have a rather strong impact. Thus, our findings support the thesis that the training programme JA Company Programme is an effective way to learn entrepreneurship.

It should be pointed out that these results are based on the students that ran a JACP firm in upper secondary school in the mid-1990s. Secondary schools and the labour market in

Sweden are different today than they were in the mid-1990s. This choice was motivated by the need for a longitudinal data series in order to study entrepreneurs during the whole of a person's life up until now, since most people start a firm between ages 35 and 45. However, there is no reason to assume that today's JA education should have a weaker effect, but rather to the contrary, since Junior Achievement Sweden's training programmes have grown in size and has been adapted to all upper secondary school course programmes available today. Additionally, the training programme JA Company Programme has all the while been developing and adapting to follow all the phases of running a firm, cooperating with, for example, the Swedish Tax Agency, the Patent and Registration Administration and the Swedish Board of Customs.

When it comes to firm survival, however, we were not able to make out any significant differences between the firms started by JA Sweden Alumni compared to the firms started by the control group. This makes sense, given that JA Sweden Alumni have greater possibility than the control group to attain a good salary as an employee, and thus should have a greater tendency to liquidate their firms even if they are doing better than the control group's firms.

The results presented in this report support the thesis that first-hand experience of entrepreneurship training programmes and education have positive effects on non-cognitive characteristics, such as persistence, creativity and forward-thinking behaviour (Huber, Sloof & van Praag). In addition to these qualities being beneficial to those who want to be successful entrepreneurs, they are also valuable in the labour market, and which has an impact in terms of lower risk of unemployment, higher salaries, and a better position in the labour market. To conclude, the results indicate that entrepreneurship training at a young age, for example as with the JA Company Programme, has long-term positive effects on students in their later professional life.

## References

- Amit, R., E. Muller, & I. Cockburn (1995). Opportunity costs and entrepreneurial activity, *Journal of Business Venturing*, 10 (2), 95-106.
- Andersson, F. & Gullberg Brännström, S. (2009). RAKS – Registerbaserad aktivitetsstatistik *Fokus på näringsliv och arbetsmarknad*. SCB: Statistiska centralbyrån.  
[http://www.scb.se/Statistik/AM/AM9903/\\_dokument/52.pdf](http://www.scb.se/Statistik/AM/AM9903/_dokument/52.pdf)
- Angrist, J. D. (1998). Estimating the Labor Market Impact of Voluntary Military Service Using Social Security Data on Military Applicants. *Econometrica*, 66(2):249-288.
- Angrist, J.D. & Pischke, J-S. (2008). *Mostly Harmless Econometrics: An Empiricists Companion*. Princeton, NJ: Princeton University Press.
- Baker, T., & Nelson, R. (2005). Creating something from nothing: Resource construction through entrepreneurial bricolage. *Administrative Science Quarterly*, 50(3): 329-366.
- Baron R.A. & Ensley M.D. (2006). Opportunity Recognition as the Detection of Meaningful Patterns: Evidence from Comparisons of Novice and Experienced Entrepreneurs. *Management Science*, 52: 1331-1344.
- Bingham C.B. & Eisenhardt K.M. (2011). Rational heuristics: the ‘simple rules’ that strategists learn from process experience. *Strategic Management Journal*, 32:1437-1464.
- Dehejia, R.H. & Wahba, S. (1999). Causal Effects in Nonexperimental Studies: Reevaluating the Evaluation of Training Programs. *Journal of the American Statistical Association*, 94(448):1053-1062.
- Delmar, F. & P. Davidsson (2000) Where do they come from? Prevalence and characteristics of nascent entrepreneurs. *Entrepreneurship & Regional Development* 12: 1-23.
- Dencker, J.C., Gruber M., & Shah S.K. (2009). Pre-entry knowledge, learning, and the survival of new firms. *Organization Science*, 20: 516-537.
- Erikson, R., Nordström Skans, O., Sjögren, A. & Åslund, O. (2007). Ungdomars och invandrades inträde på arbetsmarknaden 1985–2003. Institutet för arbetsmarknadspolitisk utvärdering IFAU Rapport 2007:18.
- Folta, T. B., Delmar, F., & Wennberg, K. (2010). Hybrid Entrepreneurship. *Management Science*, 56(2): 253-269.
- Gorman, G., D. Hanlon, & W. King (1997). Some Research Perspectives on Entrepreneurship Education, Enterprise Education and Education for Small Business Management: A Ten-Year Literature Review, *International Small Business Journal* 15(3), 56-77.
- Kolvareid, L., & Moen, Ø. (1997). Entrepreneurship among business graduates: does a major in entrepreneurship make a difference?. *Journal of European Industrial Training*, 21, 154-160.



- Landström, H. (1999). *Entreprenörskapets Rötter*. Lund: Studentlitteratur.
- Oosterbeek, H., van Praag, M. & Ysselstein, A. (2010). The Impact of Entrepreneurship Education on Entrepreneurship Skills and Motivation. *European Economic Review* 54 (3), 442-454.
- Rosenbaum, P. & Rubin, D. (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika* 70 (1983), 41-55.
- Shane, S., & Khurana, R. (2003). Bringing individuals back in: the effects of career experience on new firm founding. *Industrial and Corporate Change* 12(3), 519-543.
- Rosenbaum, P., & Rubin, D. (1984). Reducing bias in observational studies using subclassification on the propensity score. *Journal of the American Statistical Association* 79:516-524.
- Rosenbaum, P. & Rubin, D. (1985). The Bias Due to Incomplete Matching, *Biometrics*, 41:106-116.
- Rosendahl Huber, L., Sloof, R. & van Praag, M. (2012) The Effect of Early Entrepreneurship Education: Evidence from a Randomized Field Experiment. Tinbergen Institute Discussion Paper TI 2012-041/3.
- Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 26(2): 243-263.
- Solomon, G.T., Duffy, S. & Tarabishy, A. (2002). The state of entrepreneurship education in the United States: A nationwide study and analysis. *International Journal of Entrepreneurship Education*, 1, 65-86.
- Souitaris, V., Zerbinati, S., & Al-Laham, A. (2007). Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources. *Journal of Business Venturing*, 22(4): 566-591.
- Yar, D. Wennberg, K. & Berglund, H. (2008). Creativity in entrepreneurship education. *Journal of Small Business and Enterprise Development*, 15(2): 304-320.
- Wennberg, K. (2009). *Entrepreneurial Exit*. Published Doctoral Dissertation. Stockholm: Economic Research Institute.
- Wennberg, K., Wiklund, J., DeTienne, D., & Cardon, M. (2010). Reconceptualizing entrepreneurial exit: Divergent exit routes and their drivers. *Journal of Business Venturing*, 25(4): 361-375.

**APPENDIX 1**

Table 1 in Appendix 1 shows how observations are distributed among blocks when the balancing requirement is fulfilled. We observe that the spread of the probability of participation in the training programme JACP is relatively limited and ranges from 0 to 30 percent probability.

*Table 1: Lower limit, number of treated and untreated for each interval.*

Lower limit	Non-alumni	Alumni	Total
0.0052	1,465	3	1,468
0.0063	5,767	36	5,803
0.0094	27,029	146	27,175
0.0102	33,804	273	34,077
0.0109	1,755	18	1,773
0.0125	25,158	297	25,455
0.0156	22,859	338	23,197
0.0188	2,082	78	2,160
0.0250	6,144	238	6,382
0.0375	30,597	1,329	31,926
0.0438	31,986	1,660	33,646
0.0500	1,496	137	1,633
0.1000	6,761	971	7,732
0.1250	5,790	986	6,776
0.1500	7,630	1,804	9,434
0.2000	612	162	774
0.3000	3,783	1,627	5,410
<b>Total</b>	<b>214,718</b>	<b>10,103</b>	<b>224,821</b>

*Note: 17 observations are excluded on the grounds that they do not fulfill common support-criteria.*

**APPENDIX 2**

This appendix presents the correlation matrices for the variables that are included in the analysis (Note: Tables in Appendix 2 are in Swedish).

*Tabell 1: Korrelationsmatris för de oberoende variablerna för nyföretagande*

Korrelation		Andra generationens invandrare (D)	Första generationens invandrare (D)	Ekonomisk gymnasielinje (D)	Fåmansaktiebolag (D)	Eftergymnasial utbildning	Inflationsjusterat betyg
Kvinna							
Andra generationens invandrare (D)	0.003						
Första generationens invandrare (D)	0.030*	-0.053***					
Ekonomisk gymnasielinje (D)	0.034**	0.011	0.033**				
Fåmansaktiebolag (D)	-0.188***	-0.029*	-0.050***	0.054***			
Eftergymn. utbildning	0.109***	0.010	-0.000	0.141***	0.029*		
Inflationsjusterat betyg	0.190***	-0.004	-0.078***	0.077***	0.031**	0.476***	
Barn (D)	0.140***	-0.014	0.039**	-0.029*	0.056***	-0.079***	-0.049***

Method – Propensity Score Matching

Tabell 2: Korrelationsmatris för de oberoende variablerna för företagarkinkomst (del 1 ln)

	UF	Kvinna	Åldert= avgångsår>21	Ekonomisk gymnasielinje	Svensk bakgrund	Föräldrar varit företagare (D)	Akademiker- hem	Inflations- justerat betyg	Efter- gymnasial utbildning	Gift	Antal barn	Bedrev studier ht	Arbetslös
UF													
Kvinna	0,002												
Åldert=avgångsår>21	0,006	-0,006											
Ekonomisk gymnasielinje	0,000	0,033	-0,139***										
Svensk bakgrund	0,000	-0,027	-0,124***	-0,045									
Föräldrar varit företagare (D)	0,003	0,002	-0,030	0,028	0,133***								
Akademikerhem	0,004	-0,016	0,002	0,003	0,049*	-0,013							
Inflationsjusterat betyg	0,040	0,168***	-0,028	-0,112***	0,104***	-0,022	0,131***						
Eftergymnasial utbildning	0,028	0,018	-0,075**	-0,017	0,020	-0,079***	0,161***	0,387***					
Gift	0,016	0,128***	0,077***	0,091***	-0,072**	0,046*	-0,048*	-0,037	-0,094***				
Antal barn	0,014	0,151***	0,088***	0,034	-0,077***	0,055*	-0,080***	-0,074**	-0,137***	0,758***			
Bedrev studier ht	-0,002	0,036	-0,009	-0,052*	-0,042	-0,031	0,040	0,093***	0,135***	-0,076***	-0,014		
Arbetslös	-0,011	0,033	-0,008	0,009	-0,033	-0,053*	0,024	-0,016	0,057*	-0,057*	-0,037	0,110***	
Faman	0,052*	-0,179***	0,015	0,126***	0,031	0,014	-0,022	0,010	0,037	0,063**	-0,009	-0,131***	-0,128***

## Method – Propensity Score Matching

Tabell 3: Korrelationsmatris för de oberoende variablerna för företagarinkomst (del 1 ln)

Variabler			Ekonomisk		Föräldrar	Inflations-		Efter-	Bedrev				
	UF	Kvinna	Åldert=avg ångsår>21	gymnasie- linje	Svensk bakgrund	Företagare (D)	Akademike rhem	justerat betyg	gymnasial utbildning	Gift	Antal barn	studier ht	Arbetslös
UF													
Kvinna	0,000												
Åldert=avgångsår>21	0,000	-0,009											
Ekonomisk gymnasielinje	0,000	0,016	-0,111***										
Svensk bakgrund	0,000	-0,001	-0,110***	-0,062**									
Föräldrar varit Företagare (D)	0,011	-0,038	-0,005	0,037	0,133***								
Akademikerhem	-0,022	-0,017	-0,015	-0,03	0,046*	-0,015							
Inflationsjusterat betyg	0,023	0,166***	-0,01	-0,157***	0,098***	-0,018	0,146***						
Eftergymnasial utbildning	-0,004	0,017	-0,056*	-0,050*	0,03	-0,085***	0,205***	0,396***					
Gift	-0,015	0,137***	0,079***	0,059**	-0,044*	0,049*	-0,072**	-0,022	-0,082***				
Antal barn	-0,002	0,162***	0,089***	0,023	-0,049*	0,038	-0,069**	-0,042	-0,126***	0,755***			
Bedrev studier ht	-0,015	0,054*	-0,050*	-0,050*	-0,029	-0,053*	0,067**	0,069**	0,123***	-0,074***	-0,043*		
Arbetslös	-0,031	0,084***	-0,028	0,009	-0,041	-0,072**	0,046*	0,002	0,057**	-0,059**	-0,046*	0,157***	
Faman	0,058**	-0,190***	0,009	0,103***	0,035	0,047*	-0,032	0,002	0,033	0,084***	0,013	-0,152***	-0,134***