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4 *Human capital and entrepreneurs*

JUSTIN VAN DER SLUIS AND C. MIRJAM
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4.1 Introduction

In this chapter, we study the effects of human capital investments for the 10% of the labour force that is often neglected in such studies, i.e. for entrepreneurs. Entrepreneurs are defined as individuals who are self-employed, who have started their own business or who run and own an incorporated business. Policy-makers and academic researchers are increasingly aware of the importance of entrepreneurship in our society. Entrepreneurs are often seen as the engine of the economy, responsible for sustained levels of competition, the creation of jobs, and new innovative processes and products, thereby displacing ageing incumbents in a process of ‘creative destruction’. These benefits, which accrue to society at large, justify public expenditure to develop and stimulate entrepreneurship. But it is also recognized that if entrepreneurs face constraints such as limited human capital, then these economic benefits might not be realized. This realization has prompted several governments to devise public programmes to encourage entrepreneurship. Underlying most of these programmes is a belief that human capital in general affects entrepreneurs’ performance in practice. The measurement of the return to human capital for entrepreneurs is thus relevant for devising programmes to realize optimal economic benefits from entrepreneurship.

This chapter gives an overview of past and current empirical research measuring the effect of formal education, one of the most prominent manifestations of human capital, on an entrepreneur’s performance. We measure education in terms of years of schooling and the entrepreneur’s performance in terms of the individual income level. Thus, we can measure the returns to education in the same Mincerian fashion as has been done in numerous studies pertaining to employees: the percentage gain in income one would realize when an additional year of education is completed (see chapter 1). The empirical definition of an

entrepreneur is any labour force participant who is mainly active in the labour market on a self-employed basis or who is the director of his or her own incorporated business.

Past research has not yet measured the effect of formal schooling on entrepreneur performance consistently. This lack of consistency is due to shortcomings in the empirical strategies applied so far. The empirical strategies might be improved by applying techniques that are common within the technically more sophisticated literature on the returns to education for employees (see chapter 1). To our knowledge, few studies have been performed that measure the effect of specific schooling types, levels or tracks.

In section 4.2 we proceed with a brief discussion of recent applications of more advanced empirical strategies to estimate the effect of formal education in general on entrepreneurial incomes consistently. We compare the estimates of the returns to education for entrepreneurs with those of employees. As was stated in chapter 1, an abundant literature exists on estimates of the returns to education for employees in both developed and developing countries. These studies serve as a benchmark.

The findings from these studies relating to the effect of education on entrepreneurs' earnings are interesting for two reasons. First, they can be related to comparable estimates for employees, to see whether the returns to education are higher or lower for entrepreneurs than for employees. This will form a basis for private decision-making with regards to schooling and employment mode choice as well as for policy implications under quite broad assumptions about the relationship between private and social returns to education (see chapter 2). Second, if we find evidence that schooling in general has a positive effect on entrepreneurship outcomes, it is all the more relevant to strengthen the research effort aimed at differentiating this effect for various education tracks. After having discussed the results from those recent studies, we present conclusions and policy implications.

4.2 Summarizing the earlier evidence: meta-analysis

The relationship between schooling and entrepreneurship (entry and) performance has been measured in many empirical micro studies. A large portion of these studies measures the relationship between education and entrepreneurship outcomes as a by-product while

focusing on different issues. Van der Sluis, Van Praag and Vijverberg (2003 and 2005) provide an overview of these studies and they perform a meta-analysis to assess whether there are any consistent findings in the entrepreneurship and economics literature with respect to the impact of education on entrepreneurship in industrial countries and developing countries respectively. Several outcomes result from these meta-analyses. It should be kept in mind, though, that while these results do add value to the existing limited knowledge of the returns to education for entrepreneurs, they have been derived by simply averaging very diverse studies, with little adjustment for differences in data or methodology.

The impact of schooling on entrepreneurial *performance*, as has been measured in terms of various performance measures such as profit, personal income, growth or personnel, is significantly positive for 67% of the observations in industrial countries and for 50% of the observations in developed countries. Thus individuals with more schooling indeed tend to perform better as entrepreneurs.

The meta-analysis gives insight into the level of the returns to education for entrepreneurs. This insight is based on a small sub-sample of studies, using similar measures for education and earnings. For the sample of studies of industrial countries, the sub-sample happens to consist of US studies only. The return to a marginal year of schooling in terms of the income it generates turns out to be 6.1% on average. For developing countries we find a closely similar average: 5.5%. Hence, the comparison of the returns to education between industrial and developing countries seems to lead to different results for entrepreneurs than for employees. As was noted in chapter 1, employees' returns to education are higher in developing countries than in industrial countries. Moreover, comparing the percentages obtained to those mentioned in chapter 1, it seems that the returns to education are lower for entrepreneurs than for employees in both industrial and developing countries.

The meta-analysis for industrial countries allows a more direct comparison of the rate of return to education for entrepreneurs and for employees. The comparison is based on the results from twenty studies that compare the two groups of labour market participants using one dataset and thereby one set of definitions, time period, country and the like. These studies show that the returns to education are of the same order of magnitude for employees and entrepreneurs. More

specifically, all studies pertaining to Europe indicate that the returns to education are slightly, but not significantly, lower for entrepreneurs than for employees. For the United States we find the opposite: these studies indicate that the returns to education are slightly higher for entrepreneurs than for employees.

Some other results from the meta-analyses are notable and some are worth a comparison with the evidence for employees (see chapter 1 again). As for employees, the returns to education are higher in the United States than in Europe and they are higher for women than for men (both in industrial and in developing countries). However, they are lower for blacks than for whites.

Moreover, the impact of education on the business *start-up* probability of individuals in industrial countries is mostly, i.e. in 75% of cases, insignificant. This indicates that schooling levels and the choice for self-employment are unrelated. With regards to entrepreneurship choice in developing countries, more educated workers typically end up in wage employment, shunning non-farm entrepreneurship. Relative to farming, however, more educated workers seek out non-farm entrepreneurship opportunities.

The last conclusion from the literature overview concerns two limitations of the research undertaken so far. First, until recently, little effort has been put forth to differentiate the effect on entrepreneurship performance of various types of education. However, recently, various interesting turns have been taken by a couple of researchers on this path, i.e. Lazear (2004), Silva (2004) and Wagner (2002).

They investigate whether entrepreneurs are ‘jacks-of-all-trades’ relative to employees who would then be relative specialists. They test whether entrepreneurs are indeed more likely than employees to have had various professional roles in their lives (Lazear, 2004; Wagner, 2002; Silva, 2004) and/or to have followed broader and less specialized educational tracks (Lazear, 2004; Silva, 2004). Lazear concludes that Stanford Business School students who have had more various professional roles in their lives and who had chosen more diversified curricula while in business school have indeed had a higher propensity to become entrepreneurs. Wagner (2002) finds support for this conclusion: individuals (included in a representative sample of the German labour force) who have had more various professional roles and/or a more diversified professional training subsequent to their formal education tracks are more likely to become entrepreneurs. However, Silva (2004) uses a panel

dataset of graduate students as well as a sample of the general Italian working population to conclude that the causality of the results established by Lazear and Wagner is the other way around. He finds that entrepreneurs are indeed generalists but that changes in the spread of their knowledge across different fields, caused by education or work experience, do not increase the likelihood of becoming an entrepreneur. The ‘jack-of-all-trades’ characteristic is a form of innate ability that manifests itself in both valid educational and labour market curricula.

As used to be the case with early attempts to estimate the returns to education for employees, most studies have not taken account of the basic evaluation problem, discussed in chapter 1, of properly measuring the counterfactual. Hence, the results obtained and discussed so far are potentially biased. Estimation and identification strategies used to identify the effect of education on performance have merely measured the (conditional) correlation between education and performance by means of OLS rather than the causal effect, the estimate of interest.

Several methods to cope with these problems have been applied recently to estimate the returns to education for employees, see chapter 1. The general conclusion is that OLS estimates of the returns to education for employees are biased downwards (Ashenfelter et al., 1999). It remains to be analysed if and to what extent estimates of the return to education for entrepreneurs have been biased too.

The potential bias also raises suspicion about the comparisons of the returns to education for entrepreneurs and employees. The impact of such a bias on the estimated return to education can be different for entrepreneurs and employees (cf. Griliches, 1977). As a result, the conclusions from such comparisons should be re-evaluated.

In what follows, we shall briefly discuss the first applications of a little more advanced identification strategy to the estimation of the returns to education for entrepreneurs. As noted in chapter 1, the idea of IV (instrumental variables) approaches is to imitate a field experiment where individuals are randomly allocated among ‘treatments’ to estimate their effects.¹ This would mitigate the ‘basic evaluation problem’.

4.3 Our contributions

Besides the above described meta-analyses, we made two contributions to the literature. In the first contribution, Van der Sluis, Van Praag and Van Witteloostuijn (2004) compare the magnitude of the returns to

education for American entrepreneurs and employees. The returns for both groups are estimated by means of a 'random effects model' using IV, while including a set of detailed ability proxies.

We use a sample drawn from a large US panel of young adults, the National Longitudinal Survey of Youth (NLSY). The sample is a rich panel consisting of more than 6,000 individuals and nineteen annual waves. We extracted, per year observed, the hourly wage, the total years of education completed and various exogenous variables.

A particularly relevant background variable included in the NLSY is the 'Armed Services Vocational Aptitude Battery' (ASVAB), which is an IQ-like test score. It is included in the income equations for both entrepreneurs and employees. The idea is that such test scores make observable what remains unobserved otherwise, i.e. the effect of certain forms of ability on income.

A second relevant feature of the sample is that it includes both entrepreneurs and employees, and records individuals' switches between these states over time. All entrepreneurship spells, including short ones, are recorded. Therefore, the sub-sample of entrepreneurs does not suffer from survival bias, i.e., the estimate of the returns to education will not pertain to surviving entrepreneurs only. Moreover, the incomes and all other relevant variables are measured in a comparable way for both groups such that the returns to education for employees and entrepreneurs can be estimated in a comparable fashion.

The results show that the OLS estimate of the returns to education, which is estimated in this study as a benchmark, and which can be compared in terms of methodology to previous studies such as the ones included in the meta-analyses, is around 7% for both entrepreneurs and employees. In accordance with previous studies using US data the returns are slightly higher for entrepreneurs (7.1%) than for employees (6.7%), though they are clearly of the same order of magnitude (Fredland and Little, 1981; Tucker, 1985, 1987; Evans and Leighton, 1990; Robinson and Sexton, 1994).

The estimation results from using an IV approach and including the discussed ability proxies are novel and quite different: the returns to education are estimated to be higher for both entrepreneurs and employees. The increase from 6.7% to 10.7% for employees is comparable to increases resulting from applying IV instead of OLS in previous applications, such as Blackburn and Neumark (1993). A novel observation is the even greater jump in the estimated level of

the returns to education for entrepreneurs. The IV estimate amounts to 14.2% and is twice as high as the OLS estimate of 7.1%. The result is remarkable. The returns to education are estimated to be significantly higher for entrepreneurs than for employees in the United States. Previous research based on OLS estimates resulted in much smaller and insignificant differences. We perform numerous checks to assess the credibility and robustness of the result. We find that the result is not due to selectivity (i.e. caused by different types of people choosing entrepreneurship instead of wage employment), neither to a higher required *risk premium* obtained by more highly educated entrepreneurs. So why is education more valuable for entrepreneurs?

Our explanation for these results is simple. Entrepreneurs have more freedom to optimize their use of education. Entrepreneurs are not constrained by rules from superiors and can decide for themselves how to put their education to its most productive use. This difference in opportunity to optimize the productivity of education for entrepreneurs and employees might therefore be an explanation for the higher returns to education for entrepreneurs.

Our second contribution is the one by Parker and Van Praag (2004) and pertains to Dutch entrepreneurs. The meta-analysis indicated that the OLS-estimated returns to education for entrepreneurs are higher in the United States than in Europe. Moreover, the returns to education are slightly higher for entrepreneurs than for employees in the United States, while in Europe the return to education seems to be higher for employees. We will now test whether this conclusion is maintained when using a more advanced methodology (i.e. IV), for one particular country, the Netherlands. Parker and Van Praag use an improved modelling strategy by also considering the effect of human capital on borrowing constraints. We thereby measure the distinct contribution of each of the factors' human and financial capital on the incomes of entrepreneurs, taking into account the possibility that human capital might also have an indirect effect on performance by making financial capital easier to access. Both education and financial capital constraints are treated as endogenous decision variables.

The dataset used in this application is a random cross-section sample of Dutch entrepreneurs drawn in 1995. Entrepreneurial income is measured as gross personal income, consistent with entrepreneurs' and employees' incomes in Van Der Sluis, Van Praag and Van Witteloostuijn (2004). Education is measured in the usual manner: number of years of education attended.

The key result is that the direct return to schooling is almost 14%, that extra years of schooling decrease capital constraints significantly, and that capital constraints hinder entrepreneurs in their performance. The magnitude of the direct effect of education on performance is a little lower than the IV estimate pertaining to the United States. It is higher than the comparable OLS estimate. Note that the Dutch dataset is limited to entrepreneurs so we cannot compare rates of return for employees and entrepreneurs directly. However, our estimated rates of return to schooling are at the very high end of previous IV estimates obtained for employees. This is contrary to some casual 'conventional wisdom' that entrepreneurs do not need schooling to be successful.

4.4 Discussion and conclusion

Entrepreneurship has so far been a neglected topic in the economics of education. We argue, on the basis of a meta-analysis, that the returns to education for entrepreneurs need to be measured with the same methodological rigour as in the studies on employees. In particular, the neglect of the endogenous nature of schooling is a problem. We briefly discussed two recent studies that both try to deal with this problem. We think studies like these are of intrinsic interest for the academic field of entrepreneurship. Both studies have applied IV to deal with the endogeneity problem. The results from both studies imply that the OLS estimates so far have been biased downwards. Do these results then shed an entirely new light on the conclusions from the meta-analysis conducted on studies of industrial countries?

The first conclusion from the meta-analysis, i.e. that education has a significantly positive impact on entrepreneurs' performance, is supported and thus maintained. The second conclusion was that the estimated rate of return to education for entrepreneurs was 6.1% on average. This conclusion is not supported by the studies that account for endogeneity and unobserved heterogeneity. The return to education for entrepreneurs turns out to be much higher, and comparable, in the two applications discussed. Our estimate of the returns to education is a little higher than 14% for the United States; in our Dutch study the estimate of the direct return to education turns out to be a little below 14%.²

The third conclusion of the meta-analysis was that the returns to education are of the same order of magnitude for entrepreneurs and for

employees (though insignificantly higher for entrepreneurs in the United States). This conclusion is not supported by our results: the returns for entrepreneurs in the United States are shown to be much higher than the returns for employees (respectively 14.2% and 10.7%).³ The result of this study is checked to be robust. This novel finding must be somewhat puzzling in the light of the traditional studies that test screening hypotheses: apparently entrepreneurs cannot be maintained as an assumedly unscreened control group. This might explain why we find that capital constraints for entrepreneurs are relieved when the level of education is higher.

The fourth conclusion from the meta-analysis was that most previous studies, utilizing OLS, had generated potentially biased results. This potential bias, it was argued, is due to the neglect of problems related to endogeneity and unobserved heterogeneity. Previous studies that account for such problems when estimating the returns to education for employees had indeed pointed out that the bias was significant in the case of employees. The studies presented in this chapter are the first in the field of entrepreneurship that apply IV techniques and thereby account for potential endogeneity. As it turns out in both applications, the bias is significant in the entrepreneurs' case too. To put it more strongly, the bias is even larger in the case of entrepreneurs. We do not yet understand why this is the case.

Of course, the use of instrumental variables is not without critique. In particular, the choice of instruments is vital (see chapter 3 for the requirements: an instrument should have a strong effect on education and no direct influence on income). We used family background characteristics as instruments and this has been criticized by Card (1999), who states that it is possible that family background variables have an additional and separate effect on income. We therefore argue that, in order to validate our results, more analyses in this spirit should be performed with different sets of instruments. Besides the use of different instruments, the use of other identification strategies such as twin studies and field experiments are of the utmost relevance.

One other, but related, issue of concern is the low 'explanatory power' of the determinants in the entrepreneurs' income equation. We can explain only 28% of the variance in entrepreneurial income by the observed factors compared to almost 50% in the employee part of our US study. In our Dutch study we also explain 28% of the variance in entrepreneurial income. The difference found in the US

study can, at least in part, be attributed to the greater cross-sectional variance in entrepreneurs' incomes than in employees' incomes. By nature, entrepreneurial incomes are more variable and less predictable than employees' incomes.

It is still possible that we are missing some important determinants of entrepreneurial performance. The full exploitation of human, social and financial capital as determinants of entrepreneur performance should therefore be developed further. Human capital, for instance, has almost exclusively been defined as the level of education. Future research should also focus on the specific direction and compilation of the education followed (vocational studies, technical studies, subjects studied, or specific entrepreneurship orientated courses, etc.). Lazear (2004), Wagner (2002) and Silva (2004) have started exploring this interesting path.

Before we discuss policy implications it is important to elaborate on the assumptions we will impose. Not all of these conditions follow from our research, and in that sense, the policy implications are speculative. First, we assume that the difference between the social and private benefits of education is at least as large for successful entrepreneurial activity as it is for employees who do well.⁴ A successful entrepreneur is, for example, more likely to influence the competition in a market than an employee. Moreover, entrepreneurs can bring new and innovative ideas more easily into the market than employees.

Second, we assume that individuals invest in schooling at a stage in their lives at which they do not yet know, in general, whether they will become entrepreneurs or employees, or a (sequential) combination of both. As a consequence, investment in schooling is not motivated by the specific expected return when belonging to the group of entrepreneurs, but by some (weighted) average return of both employment modes.

Our third assumption is that individuals, as well as policy-makers, bankers and other parties involved, have no more insight into the returns to education than we as researchers have. This implies that individuals and policy-makers share the knowledge (and common opinion) that the returns to education are similar for entrepreneurs and for employees.

The following policy recommendations result: individual decision-makers should be aware that the returns to education for entrepreneurs are higher than those of employees. The evidence for this difference in returns is more solid for the United States than for the Netherlands.

Given this awareness, a larger proportion of individuals with higher education would choose to become entrepreneurs instead of employees than currently. Moreover, people who have a preference for entrepreneurship would be more inclined to pursue (higher) education. This would be privately beneficial for these individuals.

Many governments strongly believe in the desirability of developing more entrepreneurship. Programmes to develop and foster more entrepreneurship have been developed in many countries. In Europe, the Lisbon Strategy that aims to stimulate innovation largely through entrepreneurship has been influential on this matter.⁵

Given the desirability of promoting entrepreneurship, and the new knowledge that the returns to education are higher for entrepreneurs, governments could take two steps. They could stimulate higher schooling amongst (prospective) entrepreneurs, for instance by including entrepreneurship courses in the curricula of schools. This would make it more attractive for prospective entrepreneurs to follow more education (in schools that are now perceived as mainly educating people to become good employees). Alternatively, governments could invest in encouraging more highly educated individuals to opt for entrepreneurship. This could be accomplished by providing more information about entrepreneurship (perhaps in the form of specific courses) at universities and other institutions for higher education. The first step will make sure that entrepreneurs perform better, and that they will thereby generate more benefits, which will probably not only accrue to the entrepreneur himself but to society as a whole. The second step addresses the fact that, at least in Europe, entrepreneurship does not seem to be a favoured option, or even to be part of the choice set, amongst young people with higher education. They usually favour working in a large multinational company and do not even think about self-employment (see the results from the EU Euro-barometer, 2005).

The result of improved policy measures will be an increased number of potentially successful starters and an increased level of useful support to those starters. This will reduce the social costs of bankruptcy and increase the social benefits of innovative enterprises.

Notes

1. The IV method and the random effects model are also applied and explained in chapter 3.

2. The large difference between these estimates and the estimates based on OLS cannot be attributed to publication bias (see chapter 1): the comparable OLS estimates in our own applications are around 7%, hence very much lower.
3. The second study does not generate such a result for Europe because it analyses a sample of entrepreneurs only.
4. Note that in chapter 2 social returns to education for employees are found to be almost equal to private returns.
5. See, for instance, Commission of the European Communities (2005), stating that 'There are just too many obstacles to becoming an entrepreneur or starting a business, and, therefore, Europe is missing opportunities' (p. 16).

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