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Abstract

We examine the origins and outcome of entrepreneurship on the basis of exceptionally comprehensive Norwegian matched worker-firm-owner data. In contrast to most existing studies, our notion of entrepreneurship not only comprises self-employment, but also employment in partly self-owned limited liability firms. Based on this extended entrepreneurship concept, we find that entrepreneurship tends to be profitable. It also raises income uncertainty, but the most successful quartile gains much more than the least successful quartile loses. Key determinants of the decision to become an entrepreneur are occupational qualifications, family resources, gender, and work environments. Individual unemployment encourages, while aggregate unemployment discourages entrepreneurship.

JEL Classification: L26, M13

Keywords: Entrepreneurship, Self-employment, Spin-offs

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1. Introduction

This paper provides a comprehensive empirical assessment of entrepreneurship in Norway. Based on a panel of complete administrative worker-firm-owner data from 2000 through 2005, we examine the determinants behind the decision to become an entrepreneur, as well as the outcome of that decision, in terms of the pecuniary rewards it offers to the entrepreneur. The paper contributes to the already extensive empirical literature by introducing and exploiting a novel definition of entrepreneurship. Most existing studies follow Hamilton (2000) and interpret entrepreneurship as equivalent to self-employment; see, e.g., Van der Sluis *et al*. (2008) for a recent survey. We argue that this definition is too narrow for our purpose, as the founders of new enterprises often become employees in the firms they created. We therefore extend the definition of entrepreneurship to include persons who are employed in a firm in which they are significant owners, directly or indirectly through ownership in other firms. This extension raises the number of entrepreneurs in Norway by 81 percent compared to an entrepreneurship definition based on registered business earnings from self-employment only. And importantly, the additional entrepreneurs identified through the data on limited liability companies turn out to be among the most successful; hence they change our understanding of how entrepreneurial endeavors are rewarded in the market.

The results presented in this paper are based on three different methodological approaches. We start out with a simple cross-sectional probability model accounting for the prevalence of entrepreneurship at a given point in time. This analysis focuses on the impacts of gender, age, social and economic background, and educational attainment. We then turn to a model explaining what we coin *proactive* and *reactive* entrepreneurship decisions; i.e., entrepreneurship decisions taken by fully employed and unemployed individuals, respectively. These analyses focus on how conditions relating to the initial state, e.g., in the form of an existing employer's productivity and profitability, affect the decision to embark on entrepreneurship. Finally, we exploit the statistical transition models to establish matched comparison groups to the individuals who actually became entrepreneurs, with the purpose of investigating the short- and medium term private returns to entrepreneurship. Throughout the paper, we maintain a sort of bird's-eye view and seek

to distinguish the empirically important mechanisms from the unimportant; we are therefore broad in our approach, and do not go deeply into any single research question. The latter is on our agenda for future research.

The existing entrepreneurship literature mirrors two very different ideas of what entrepreneurship is about. The first focuses on value *creation*; i.e., it builds on the Schumpeterian notion of the entrepreneur as the economy's innovator. According to OECD (2003; 2005), around 20-40 per cent of the overall labor productivity growth in eight major industrialized countries can be directly attributed to the reallocation of inputs arising from the entry of new and the exit of old firms. A dynamic economy needs entrepreneurial risk-takers to advance the process of creative destruction by which obsolete ideas and technologies are replaced by new ones. In the words of Schumpeter himself (1947, p. 151), the entrepreneur is responsible for "the doing of new things or the doing of things that are already being done in a new way". Not all entrepreneurial activities are innovative, however. And a high rate of firm formation may arise from static market characteristics, rather than from particularly innovative agents. The second line of thought focuses on entrepreneurship as a tool for value *appropriation*. It rests on the idea that the prospects for obtaining an owner's rent in a particular market depend on production technology and market structure. Entrepreneurship is predicted to be prevalent in sectors/occupations where the physical capital requirements are limited, where the minimum efficient scale is small, and where the employees have direct contact with customers so that they can easily carry their customer base to a new firm.

The empirical evidence presented in this paper shows that the latter notion of entrepreneurship has left more conspicuous traces in the data than the former, in the sense that the most entrepreneurial workers are not the engineers, the businessmen, and the scientists, but rather the dentists, the veterinaries, and the hairdressers. According to our entrepreneurship definition, the observed entrepreneur rate among hairdressers is in fact almost ten times as large as the entrepreneur rate among scientists with PhD. This does of course not rule out a significant role for entrepreneurship as a force of innovation and value creation. But it does suggest that any meaningful empirical analysis of entrepreneurship needs to take the individuals' educational and occupational choices into account. And while the length of education turns out to be a poor predictor for entrepreneurship

decisions, the *type* of education is among its key determinants. This phenomenon also gives rise to a somewhat surprising intergenerational transmission mechanism. We find that social background – as captured by the level of parents' education – is virtually uncorrelated with the offspring's entrepreneur propensity. This changes fundamentally, however, when we condition on the type and level of the offspring's own education. The upshot is that highly educated parents tend to encourage their offspring to take a high – but thereby also a fairly "un-entrepreneurial" – education; but given the offspring's educational choice, the high-education family background breeds entrepreneurship.

Regardless of family background and occupation, *gender* seems to be a major determinant of entrepreneurship. Norway is normally considered a country with relatively equal opportunities for men and women. This is reflected in one of the world's highest female employment rates, and in the fact that there are almost no differences in the overall participation rates of men and women; see, e.g., OECD (2007, pp. 247-248). We find, however, that this pattern of gender equality does not at all apply to entrepreneurship. According to our entrepreneurship definition, the fraction of entrepreneurs in the Norwegian workforce is as much as 3.4 times larger for men than for women, indicating a much larger gender-divide that what can be inferred from data on self-employment only. Moreover, the gender differences are virtually unaffected by conditioning on educational/occupational choices.

We examine the origins of entrepreneurship by analyzing the decision to leave a regular job for entrepreneurship, or to escape unemployment by means of starting a business activity. There is an active literature on spinoff formation; see for instance Sleeper (1998), Klepper and Sleeper (2002), Agarwal et al (2004), and Hellman (2006), aiming at identifying the type of firm characteristics that foster entrepreneurship and spinoffs. We make a novel contribution to this literature by exploiting our access to audited accounts for all Norwegian limited liability firms to investigate the impacts of a firm's economic performance on the entrepreneurship propensity among its employees. We find that entrepreneurship increases with a firm's profitability and declines with its value added per employee; hence by allocating a low share of the factor income to its workers, a firm incites its employees to start their own business. We show that *un*employed jobseekers have a higher probability of starting their own businesses than fully employed workers,

but that *under*employed workers are the most entrepreneurial of all. Downsizing of existing firms also breeds entrepreneurship among the (potentially) affected employees. Apparently, the process of job destruction does contain some seeds of creativity. However, conditional on labor market status (employment or unemployment), we find that high and rising occupation-specific aggregate unemployment discourages entrepreneurship. Thus, while individual joblessness encourages entrepreneurship, aggregate unemployment discourages it.

We find that the transition rate into entrepreneurship tends to be positively correlated to the level of "available" wealth, either owned by oneself, the spouse, or the parents. This may reflect decreasing absolute risk aversion, the prevalence of credit constraints, and/or spurious correlation arising from a selective distribution of assets. Insurance against failed entrepreneurship is also provided by the earnings of other household members. We find an interesting gender-twist in the estimated impacts of family resources, though, which to our knowledge has not previously been recognized in the literature: Married men are much more responsive than married women towards the levels of the spouse's wealth and earnings. Own wealth, on the other hand, has a stronger effect on female than on male entrepreneurship. We also identify a conspicuous exception from the otherwise positive association between economic resources and the entrepreneurship propensity: For unmarried unemployed individuals, the entrepreneurship propensity correlates *negatively* with wealth. Hence, it is the lack of economic resources that push job seekers into entrepreneurship rather than the profit opportunities that attract them. Necessity seems to be "the mother of invention" among the unemployed.

The existing empirical literature tends to indicate that entrepreneurship does not pay off economically, and that entrepreneurship is primarily motivated by non-pecuniary factors, such as personal pursuit of autonomy and job satisfaction. Parker (2004, p 16) refers to the "tentative emerging consensus" that entrepreneurs earn less than employees. Hamilton (2000) provides evidence that many workers are actually willing to forgo significant earnings premiums as employees in order to remain self-employed. And questionnaire analyses invariably show that the search for independence and the desire to fully exploit own skills are ranked much higher among the determinants of new firm formation than the pursuit of monetary rewards; see Santarelli and Vivarelli (2007). Our

findings challenge the "emerging consensus" that entrepreneurship does not give rise to personal economic gains. We find that there is in most cases a significant income premium associated with entrepreneurship, but that this expected premium has to be traded off against higher income variability, just as we would expect from theoretical considerations; see Iyigun and Owen (1998). And quite interestingly, given the gender patterns described above, we find that the income premium associated with the entrepreneurship decision tends to be larger for women than for men.

2. Data and definition of entrepreneurship

The analyses in this paper rely on three blocks of administrative register data. The first block contains comprehensive information on economic activities for all residents in Norway, based on employment registers, tax records, unemployment registers, social security files and education registers. This block also contains detailed information on demographics and other background variables, such as age, gender, education, nationality, family background, marital status, children, wealth, previous earnings, and place of residence. The second block contains annual audited accounting data for the majority of firms in Norway, including all limited liability companies.[1] The third data-block lists the major owners and board members of all limited liability companies. An owner is recorded if his/her/its share in a company exceeds 3 percent. Importantly, the three blocks contain the same (encrypted) individual as well as firm identification numbers, making it possible to merge information on, e.g., labor market activity, firm ownership, and firm performance at the individual (owner) level.

We exploit the three data-blocks to identify a *main economic activity* by October 1 each year (2000-2005) for all residents in Norway. The mutually excluding main activities are i) regular employment, ii) entrepreneurship, iii) education, iv) unemployment, v) retirement or disability pension, and vi) other. The latter of these activities comprises individuals for which it is difficult to establish a single main activity (due to combination of

[1] The audited accounts are recorded for all enterprises with an obligation to keep accounts, in addition to a number of firms registering their accounts voluntarily. All limited liability and state-owned companies and most general and limited partnerships are obliged to keep accounts. Sole proprietorships are obliged to keep accounts if their assets exceed NOK 20 million or if they employ more than 20 man-labor years.

multiple apparently minor activities) or for which none of the other five activities are recorded (members of the armed forces, homemakers, temporary migrants).

Our notion of entrepreneurship includes self-employment in the form of sole proprietorship as well as regular employment in partly self-owned limited liability companies and partnerships. According to this definition, an entrepreneur is a person who takes actively part in managing a company in which he/she also invests capital and thus bears a significant part of the economic risks involved. The mode of ownership is of secondary importance. More precisely, we define an entrepreneur as a person who is either employed in a firm in which he or she directly or indirectly is a major/active owner (defined as either controlling at least 30 percent of the company or controlling at least 10 percent of the company *and* being a board member or a chief executive) *or* who runs his or her own business as a sole proprietor. Identification of active owners in limited liability companies is a non-trivial exercise, given the high frequency of cross-ownership among companies. A typical situation is that a person is fully employed in a company A and at the same time is a major owner in another company B, indicating (at first sight) that employment is the main economic activity. By closer inspection, however, it may turn out that company A is owned partly or wholly by company B, sometimes through a third company C (or through several company linkages). Hence, in order to correctly identify the active owners – our entrepreneurs – we use the data to trace out the degrees of *ultimate* ownerships. Note, however, that we do not define a person as an entrepreneur if earnings from fulltime employment in another firm (which the person does not own according to the definition above) exceed earnings from the owned business activity; i.e., we require that entrepreneurship is *the most important* economic activity.

As a result, we end up with a rather comprehensive concept of entrepreneurship, which is closer to the notion of "having created an enterprise" than the narrower concept of "self-employment" typically encountered in the empirical literature. As it turns out, the extension to also count "employed owners" as entrepreneurs raises the number of entrepreneurs in Norway by 81 percent compared to an entrepreneurship definition based on administratively registered business earnings from self-employment only. Compared to the more commonly applied survey based definition of self employment (from labor force sample surveys) it raises the number of entrepreneurs by around 25 percent.

3. Descriptive statistics – entrepreneurship in Norway

The upper panels of Figure 1 display the distribution of main economic activities for the whole Norwegian working-age population by gender and age in 2005. The first striking observation is that entrepreneurship is much more prevalent among men than women. The age profiles also differ across gender; the peak entrepreneurship age is 52 for men (with 13.4 percent of the population) and 47 for women (with 3.6 percent of the population). It is worth noting that the fractions in regular employment are very similar for men and women, although the decline starts much earlier for men (around age 37) than for women (around age 49), largely reflecting the rising entrepreneurship propensity among men.

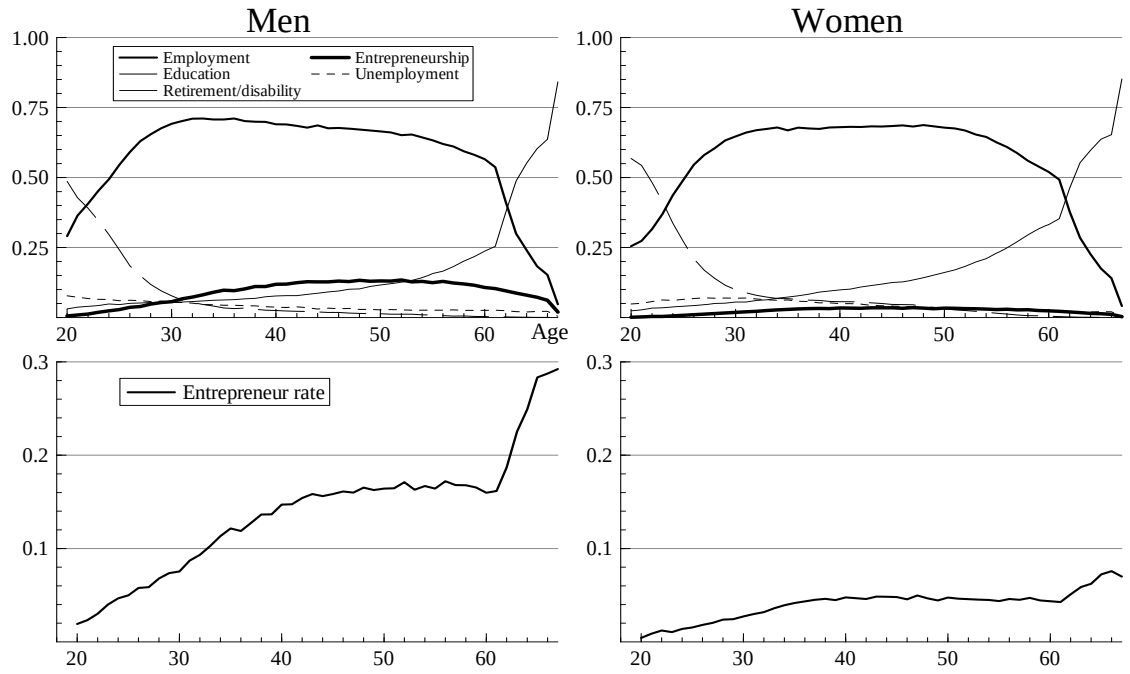

Figure 1. Main economic activity in 2005, by gender and age. Upper panels show fraction of population in each state. Lower panels show the fraction of entrepreneurs among those who are either employed by others or entrepreneur.

The lower panels of Figure 1 display the "entrepreneur rate", defined as the fraction of entrepreneurs among those who are either in regular employment or in entrepreneurship. For men, this rate rises gradually until the mid 40's, after which it stabilizes around 16-17 percent. It then again rises sharply after the age of 60, reflecting that employed workers tend to retire much earlier than entrepreneurs. For women, the entrepre-

neur rate stabilizes already in the mid 30's around a level of 4-5 percent. After the age of 60, it rises as a result of early retirement among employees. On average, the entrepreneur rate in our 2005 data is 9.1 percent; 13.4 percent for men and 4.0 percent for women. In comparison, the "self-employment" rates reported from labor force sample surveys for the same year were 7.4 percent for all workers, 10.2 percent for men, and 4.5 percent for women (OECD, 2008). Hence, it is clear that *for men*, our entrepreneur definition covers a significantly larger fraction of the Norwegian workforce than the survey-based self-employment concept. This probably reflects that more than 80 percent of the entrepreneurs identified through data on ownership in limited liability companies are men. Our entrepreneurship definition thus entails an even larger gender divide in entrepreneurship than indicated by self-employment patterns. While the ratio of the male to female entrepreneur rates is 2.3 according to the commonly used survey-based self-employment definition, it is as high as 3.4 according to our definition.[2]

Based on administrative income files covering all sources of income, we are able to compute comprehensive income measures for employees as well as entrepreneurs, including labor earnings, business income, dividends, and other capital income. From 2002 through 2005, dividends were not subject to income taxation in Norway; hence during this period entrepreneurs did not have any tax-incentives to retain profits within firms. Such taxation was reintroduced in 2006, however; and since the change was announced in advanced, it resulted in exceptionally high dividends in 2005.

Figure 2 shows how total incomes developed among full time employees and entrepreneurs from 2000 through 2005.[3] Both mean and median incomes are significantly higher among entrepreneurs than among full time employees. Entrepreneurial incomes are much more variable, however, as reflected by the large difference between incomes in the 10^{th} and the 90^{th} percentile of the two income distributions. It may also be noted that

[2] Two alternative survey-based entrepreneurship definitions that can both be constructed from the so-called Global Entrepreneurship Monitor are the concepts of "early stage entrepreneurial activity" and the "established business ownership"; see, e.g., Bosma *et al.* (2008). The former of these covers individuals involved in setting up a brand new business and owners and managers in relatively young (up to 3.5 years) enterprises, while the latter covers owners and managers in established businesses. For Norway 2005, these measures indicate a ratio of male to female early stage entrepreneurship of only 1.2 and a rate of male to female established business ownership of 2.3 (Minniti *et al.*, 2006).

[3] All incomes reported in this paper are measured in Norwegian Kroner (NOK). 1 NOK is typically valued at around 15-20 cents (0.15-0.20 $).

the entrepreneurs identified through company ownership data tend to have higher incomes than the entrepreneurs identified directly through self-employment business income (not shown in the graph). In 2003, median income in the former group was 31 percent higher than in the latter group, whereas the mean income was as much as 85 percent higher.

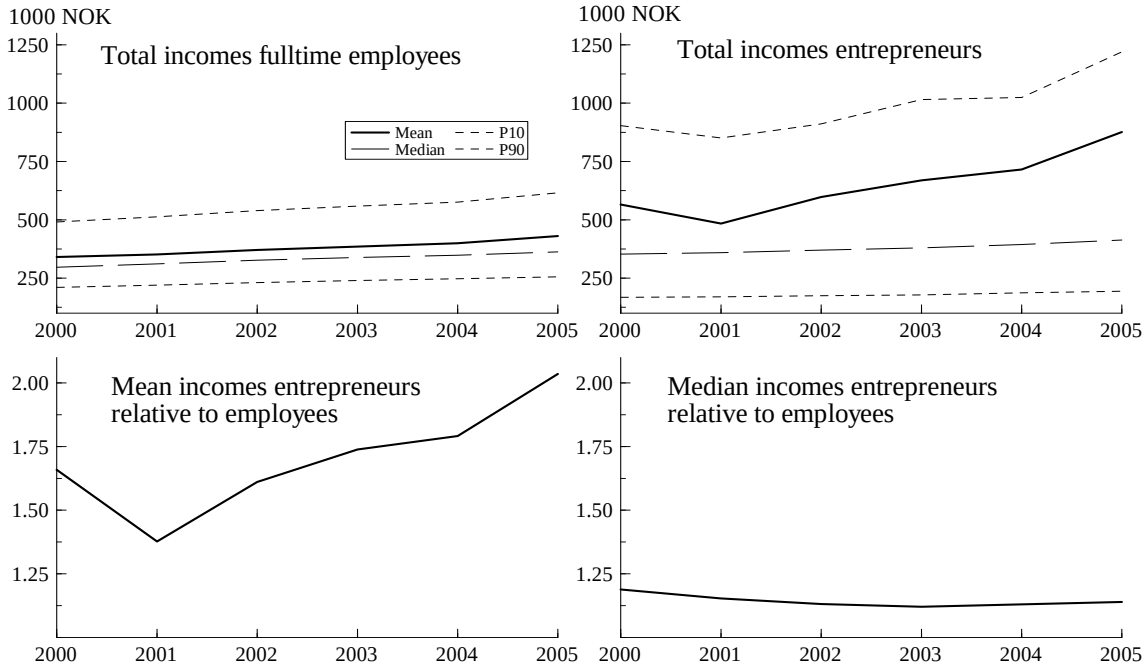

Figure 2. Total incomes for fulltime employees and entrepreneurs 2003.
Note: Entrepreneurs in agriculture and fisheries are not included. Total income includes labor and business earnings, dividends, and other capital income.

The apparent entrepreneurship income premium prevails even conditional on the length and type of education. Table 1 reports the entrepreneur rates and the entrepreneur-employee income differentials for 34 different education groups in 2003.[4] Both mean and median earnings are higher among entrepreneurs than among full time employees in almost all education groups. The highest entrepreneurship-premium is recorded for lawyers and businessmen, while the highest entrepreneurship rates are recorded for dentists and veterinaries. Even though the latter two groups have many years of education, the general pattern is that entrepreneur rates are significantly higher among persons with low than among persons with high education. The mean entrepreneurship rates are 0.13 for com-

[4] We have chosen 2003 for this comparison because it seems to be a relatively "normal" year in terms of the income differential between entrepreneurs and full time employees.

pulsory, 0.14 for lower secondary, 0.11 for upper secondary, 0.07 for bachelor, 0.08 for master, and 0.04 for PhD education.

Table 1
Entrepreneurship and relative earnings by education 2003. All sectors except agriculture and fisheries. All earnings included.

	Number in full employment or entrepreneur-ship	Entrepreneur rate	Earnings in entrepreneurship relative to full employment			
			Relative mean	Relative median	Relative P10	Relative P90
Compulsory education only	229,542	0.13	1.48	1.15	0.78	1.70
Lower secondary						
General subjects	44,633	0.14	2.28	1.25	0.73	2.37
Fabrication, mining, etc.	5,851	0.15	1.35	1.11	0.77	1.53
Business, office work	13,291	0.15	2.19	1.29	0.79	2.67
Construction, building, car-pentry, mechanics etc.	42,814	0.16	1.44	1.13	0.76	1.66
Hairdresser	852	0.37	1.06	0.99	0.77	1.33
Arts and handicraft	4,492	0.13	1.42	1.10	0.70	1.79
Other	91,222	0.13	1.77	1.22	0.76	2.09
Upper secondary						
General subjects	88,286	0.12	2.19	1.18	0.73	2.19
Fabrication, mining, etc.	21,846	0.08	1.51	1.11	0.76	1.70
Business, office work	41,091	0.16	2.08	1.23	0.83	2.16
Construction, building, car-pentry, mechanics etc.	173,753	0.12	1.37	1.08	0.78	1.55
Hairdresser	6,618	0.44	1.31	1.18	0.99	1.47
Nursing	7,661	0.01	1.26	1.20	0.85	1.52
Arts and handicraft	6,152	0.18	1.45	1.18	0.84	1.80
Other	99,584	0.07	1.66	1.14	0.75	1.67
Bachelor level						
Business and administration	60,819	0.11	2.71	1.32	0.69	2.86
Building, construction (engi-neer)	35,081	0.13	1.90	1.13	0.73	2.22
Therapeutic subjects (physio-therapist)	3,724	0.21	1.67	1.50	1.15	2.00
Nursing	33,668	0.01	1.61	1.13	0.67	1.98
Pedagogic subjects (teachers)	84,359	0.03	1.65	1.06	0.62	1.93
Other	109,687	0.07	1.74	1.06	0.59	1.77
Master level						
Business and administration	4,951	0.07	3.51	1.07	0.49	2.88
Building, construction (engi-neer, architect, etc.)	19,644	0.12	1.64	1.12	0.67	1.80
Natural science	19,451	0.05	1.70	1.09	0.56	1.69
Computer science, mathemat-ics etc.	3,077	0.06	1.64	1.21	0.56	1.79
Law	10,759	0.11	3.76	2.11	0.89	3.93
Social science	7,263	0.03	2.63	1.12	0.51	2.12
Psychology	2,749	0.07	1.50	1.44	0.96	1.79
Medicine (doctors)	7,904	0.12	1.53	1.34	1.00	1.67
Dentistry	1,462	0.47	1.85	1.65	1.23	2.21
Veterinary	709	0.50	1.11	1.12	0.90	1.13
Other	25,537	0.04	1.90	0.97	0.49	1.90
PhD level – all subjects	10,494	0.04	1.40	1.21	0.54	1.71

The "snapshot" distributions of the residents' main economic activities illustrated above are generated by significant flows between the various states. To illustrate, Table 2 shows a typical annual transition matrix between the main economic activities during the period from 2000 to 2005. The annual transition rate from regular employment to entrepreneurship was on average 1.0 percent (1.5 percent for men and 0.5 percent for women; not shown in the table), while the transition rate from entrepreneurship to regular employment was 8.7 percent.[5] The average transition rate from unemployment to entrepreneurship was 2.1 percent (3.2 percent for men and 0.9 percent for women); i.e., roughly twice as high as the transition rate from employment to entrepreneurship. Only 1.0 percent of the entrepreneurs become unemployed from one year to another, compared to 2.8 percent of the employed (these numbers were roughly the same for men and women). This reflects, however, that self-employed individuals are not insured against unemployment in the social security system; hence ex-entrepreneurs have weaker incentives than ex-employees to register as unemployed.

Table 2
The distribution of main economic activities in 2000-2005 and the transitions between activities from year to year (percent). Age 20-65.

		State in year t+1					
State in year t		Employ-ment	Entre-preneur	Edu-cation	Unem-ployment	Pension/ disability	Other
Employment	60.3	89.3	1.0	3.2	2.8	2.2	1.5
Entrepreneur	6.5	8.7	81.2	0.7	1.0	1.4	7.0
Education	8.7	30.7	0.7	60.5	3.7	1.0	3.5
Unemployment	4.5	39.4	2.1	5.5	41.7	3.8	7.5
Pension/disability	12.9	3.0	0.2	0.3	1.3	93.2	2.0
Other	7.1	13.6	4.9	3.3	4.3	5.5	68.5

[5] In comparison, Hyytinen and Maliranta (2008) report an annual transition rate from employment to entrepreneurship in Finland around 0.7 percent. Both the Norwegian and the Finnish transition rates to entrepreneurship are significantly below the 2.0-3.5 percent annual switching rate from employment to self-employment typically recorded in the U.S.; see Parker (2004, p. 52).

4. The determinants of entrepreneurship

This section examines the determinants of entrepreneurship in Norway by means of multivariate probability models. We first analyze the cross-sectional pattern of entrepreneurship displayed in Figure 1, before we turn to the *transitions into* entrepreneurship from employment and unemployment; i.e., proactive and reactive entrepreneurship decisions, respectively. In the cross-sectional analysis, we focus on the impacts of truly exogenous background characteristics, such as gender, age, ethnic origin, and family background, as well as of potentially endogenous state-variables, such as educational attainment and family situation. In the transition rate analysis, we focus on factors that potentially affect the decision to *become* an entrepreneur, such as own and family wealth, the quality of a current job match, and the tightness of the local labor market. For ease of interpretation, we report in the following subsections estimates from linear probability models (multiplied by 100); i.e., the mean percentage point impacts of various explanatory variables on the probability of *being* or of *becoming* an entrepreneur. To save space, most of the coefficients are reported with indicators of statistical significance, rather than standard errors. The significance statements are based on robust standard errors, taking into account that multiple observations for the same individual are not stochastically independent. A complete list of estimation results with (robust) standard errors are reported on our web site www.frisch.uio.no/docs/entrepreneurship.html. On this site, we also report estimates (and standard errors) from logit models.

Given the large dataset, we specify many of the explanatory variables as categorical to avoid unjustified functional form assumptions. A particularly important variable in this regard is educational attainment. A closer inspection of the entrepreneurship rates reported in Table 2 indicates that a number-of-years-specification of the education effect is likely to be misleading. Instead, we assign a separate indicator variable to each education type reported in that table. On the basis of family linkages, we identify partners (married or cohabitating with joint children) and parents. Together with information on labor market status, income, and wealth, we use the family identifiers to construct variables designed to reflect entrepreneurship opportunities and family obligations (family wealth, partner's economic status, the presence of small children etc.). We also use these

variables to characterize each person's family background, in terms of the parents' educational attainment, wealth, and entrepreneurial activities.

For currently employed workers, we collect a host of information regarding the quality of the job match. Individual return from the current job is measured in terms of absolute earnings and in terms of earnings relative to other Norwegians of approximately the same age and with exactly the same education. The quality of the workplace is measured by value added and running surplus per man-year, by the employee turnover rate, and by downsizing events. The innovativeness of the work environment is represented by the fraction of employees with very high education and by the number of R&D man-years relative to total man-years. Firm size is measured as the (log of the) number of employees. And the type of work is measured by industry indicator variables. All earnings and wealth variables are measured in actual values, rather than in logs. The main reason for this is that these variables are frequently negative (wealth) or zero (earnings). To avoid outliers from obtaining excessive influence on regression results, we have censored the wealth and earnings variables at the 1^{st} and the 99^{th} percentile. Labor market tightness is measured by calculating, for each year and for each of Norway's 19 counties, the unemployment rate for each of the 34 education groups referred to above.

4.1 The probability of being an entrepreneur

The first model takes an indicator variable for *being an entrepreneur in 2005* as the dependent variable, given that a person is either employed or entrepreneur. We use this model to examine the impact of background characteristics, education, and family situation on the cross-sectional entrepreneur propensity.

Table 3 examines the gender differential. Conditional on age (47 dummy variables) and nationality (10 dummy variables), women have a 7.8 percentage point lower probability than men of being an entrepreneur in 2005 (Model I). Also conditioning on the education type and level (34 dummy variables) hardly affects the gender differential at all; hence the gender divide is *not* explained by differences in formal qualifications (Model II). Conditioning on family structure (marital status and children) does not change the estimated impact of gender either (Model III). However, when we allow the gender differential to vary according to family structure (Models IV-VI) we find that the

differential is larger for married couples with children than for couples without children and singles. The gender divide therefore seems to be related to some form of within-family specialization and risk-sharing.

Table 3. The impact of gender and family situation on entrepreneurship propensity in 2005
Estimates from linear probability models (OLS) (multiplied by 100)

	Model I All	Model II All	Model III All	Model IV Married with children	Model V Married without children	Model VI Unmarried
Being a women	-7.79***	-7.57***	-7.70***	-8.92***	-4.39***	-6.77***
Being married or cohabiter			0.74***			
Age of youngest child						
No children			Ref.			Ref.
0-3 years			1.43***	Ref.		1.55***
4-6 years			1.93***	0.65***		1.88***
7-16 years			1.96***	0.62***		1.91***
17 years or more			1.27***	-0.09		1.10***
Additional controls						
Age	X	X	X	X	X	X
Nationality	X	X	X	X	X	X
Education		X	X	X	X	X
Number of observations	1,865,615	1,865,615	1,865,615	910,180	76,659	878,776

*(**)(***) Significant at the 10(5)(1) percent level.

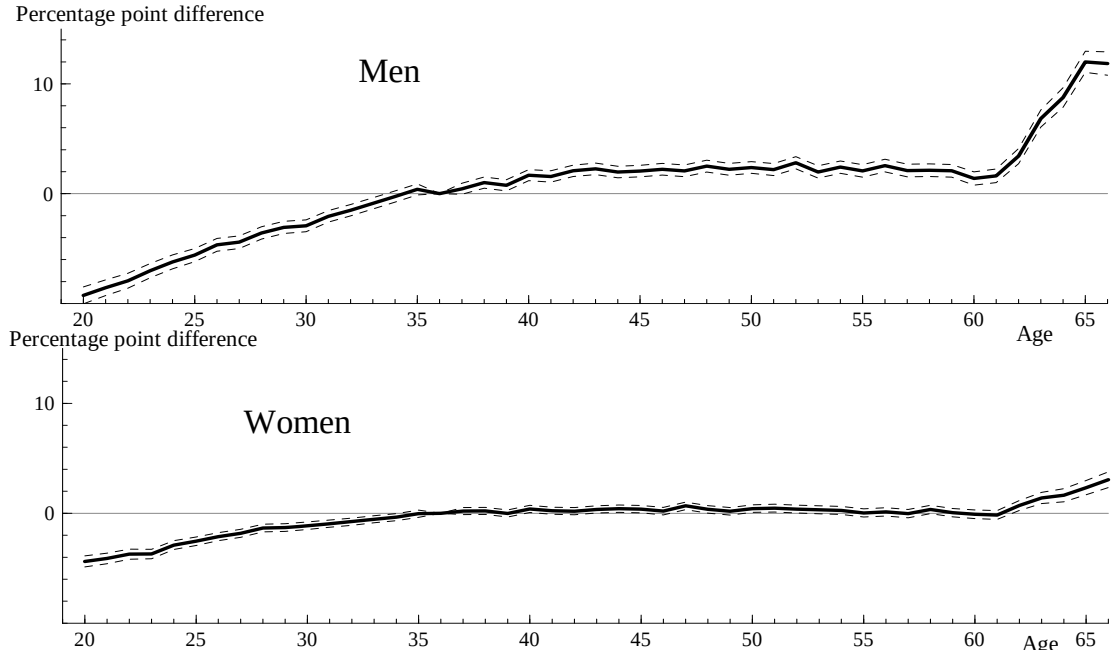

Figure 3. Estimated effects of age on the percentage point probability of being an entrepreneur in 2005, conditional on being entrepreneur or employee (with 95 percent confidence intervals). Reference is age 36.

Given the large gender differences, we examine the impacts of other covariates separately for men and women. Effects of age, education, nationality, marital status, and children are estimated on the basis of models including all these variables simultaneously. The estimated age effects shown in Figure 3 are very similar to the age profiles of the entrepreneur rate provided in the lower panels of Figure 1, indicating that the latter were not driven by gender differences in educational attainment across birth cohorts.

Table 4. The impact of educational attainment on entrepreneurship propensity in 2005
Estimates from linear probability models (OLS) (multiplied by 100)

	Men	Women
Compulsory education only	Ref.	Ref.
Lower secondary		
General subjects	2.51***	0.25*
Fabrication, mining, etc.	-0.99*	0.45
Business, office work	4.44***	0.67***
Construction, building, carpentry, mechanics etc.	-0.26	1.93***
Hairdresser	22.60***	18.40***
Arts and handicraft	6.59***	1.58***
Other	0.70***	-0.95***
Upper secondary		
General subjects	0.57***	0.54***
Fabrication, mining, etc.	-3.09***	-0.61**
Business, office work	5.86***	1.03***
Construction, building, carpentry, mechanics etc.	-0.50***	-0.00
Hairdresser	35.20***	23.30***
Nursing	-10.30***	-2.91***
Arts and handicraft	7.47***	5.74***
Other	-3.85***	-1.04***
Bachelor level		
Business and administration	0.04	0.15
Building, construction (engineer)	-2.68***	0.11
Therapeutic subjects (physiotherapist)	25.00***	7.35***
Nursing	-11.00***	-3.19***
Pedagogic subjects (teachers)	-8.98***	-2.41***
Other	-4.17***	-0.72***
Master level		
Business and administration	-3.78***	-0.64
Building, construction (engineer, architect, etc.)	-2.96***	1.65***
Natural science	-7.58***	-2.64***
Computer science, mathematics etc.	-6.37***	-2.13**
Law	0.68	-1.47***
Social science	-9.64***	-2.56***
Psychology	-4.08***	-0.88*
Medicine (doctors)	-3.11***	1.08***
Dentistry	29.90***	17.70***
Veterinary	20.40***	27.80***
Other	-9.61***	-1.53***
PhD level – all subjects	-11.20***	-2.98***
Number of observations	1,012,921	852,694

Additional controls: Age (47 dummies), family situation (5 dummies), nationality (10 dummies).
*(**)(***) Significant at the 10(5)(1) percent level.

The estimated impacts of educational attainment are reported in Table 4, separately for men and women. The most entrepreneurial workers are the hairdressers, the dentists, the veterinaries, and the therapists. The least entrepreneurial workers are the researchers (with PhD), the nurses, the social scientists, and the teachers. Virtually all the highest education tracks (master and PhD levels) are associated with low entrepreneurship rates, except for the dentists and the veterinaries.

Table 5 reports the estimated impacts of marital status and responsibility for children. Being married is associated with high entrepreneurship propensity for both men and women. Probable mechanisms behind this relationship are i) that an *employed* spouse provides income insurance against the risky return from entrepreneurship, ii) that a *self-employed* spouse offers crucial knowledge and networks, iii) that a *non-employed* spouse supplies cheap (non-taxed) and reliable labor (eliminating agency problems), and iv) that entrepreneurial people are more likely to be married than non-entrepreneurial people (sorting). Having responsibility for children, however, affects the male and the female entrepreneurship propensity very differently. For men, it entails a significant rise in entrepreneurship, and the rise is largest if the youngest child is above school-starting age (6 years). For women, it entails a negative effect if the youngest child is below 3 years; and no effect otherwise.

Table 5 The impact of family situation on entrepreneurship propensity
Estimates from linear probability models (OLS) (multiplied by 100)

	Men	Women
Being married or cohabiter	0.37***	0.91***
Age of youngest child		
No children	Ref.	Ref.
0-3 years	1.98***	-0.19**
4-6 years	2.80***	-0.00
7-16 years	3.21***	0.01
17 years or more	2.98***	-0.12
Number of observations	1,012,921	852,694

Additional controls: Age (47 dummies), education (34 dummies), nationality (10 dummies).

We have also included dummy variables for country of origin in these regressions. With two important exceptions, it turns out that having been born outside Norway reduces the entrepreneurship propensity (not shown in tables). The exceptions are those born in other Northern European countries and, most interestingly, those born in Pakistan. In particular, a man from Pakistan has a 10.1 percentage point higher probability of being an entrepreneur than a native man, ceteris paribus. The Pakistani workforce in

Norway is of particular interest because it is dominated by labor migrants who entered the country during the early 1970's; hence they have had more than 30 years to assimilate into the Norwegian labor market. Previous evidence has indicated poor long-term labor market performance in this group, with low employment and high disability rates; see Bratsberg *et al.* (2008). If these groups face discrimination in the ordinary labor market, they will have a particularly strong incentive for exploiting their skills in entrepreneurship.

Table 6. The impact of family background on entrepreneurship propensity in 2005
Estimates from linear probability models (OLS) (multiplied by 100)

	Model I Men	Model II Men	Model III Men	Model IV Women	Model V Women	Model VI Women
Explanatory variables						
Max(parents education) (Years)	-0.09***	0.22***	0.22***	0.02*	0.12***	0.12***
Sum of parents' wealth (Mill. NOK)	1.60***	1.82***	1.85***	0.77***	0.86**	0.85***
Parent current entrepreneur (2005)	6.81***	6.45***	6.39***	2.23***	1.98***	1.99***
Parent previous entrepreneur (2000-2004, but not 2005)	5.89***	5.57***	5.52***	1.90***	1.72***	1.72***
Controls						
Age	X	X	X	X	X	X
Nationality	X	X	X	X	X	X
Education		X	X		X	X
Marital status			X			X
Children			X			X
Number of observations	749,770	749,770	749,770	625,859	625,859	625,859

To assess the impacts of family background, we pursue the same strategy as with gender, and introduce covariates in a step-by-step fashion; i.e., we first include controls for age and nationality only, and then add controls for educational attainment and own family situation. The analysis is done separately for males and females. Family background clearly has a large impact on offspring's entrepreneurial endeavors; see Table 6. In particular, the parents' joint wealth has a significant positive impact on the offspring's entrepreneurship. And if one of the parents is (or recently has been) an entrepreneur, the offspring's entrepreneur-propensity rises substantially. This effect operates partly through the offspring's direct involvement in the parent's firm. In 44 percent of the cases where both a parent and the offspring are entrepreneurs simultaneously, they are entrepreneurs in the *same firm*, and in 50 percent of the cases where the parent has recently been entrepreneur, the offspring's entrepreneurship represents a continuation of the parent's firm. Direct inheritance of or involvement in a parent's firm is much more common for sons

than for daughters. Only 21 percent of the joint (or inherited) parent-offspring entrepreneurships involve daughters.

An interesting point to note is that the length of parents' education has a negative (for men) or only weakly positive (for women) "gross" impact on the offspring's entrepreneurship propensity (Models I and IV in Table 6). This changes fundamentally, however, when we condition on the offspring's own education, in which case parental education has a clear positive impact on entrepreneurship (Models II and V). The coefficients are almost unchanged when we include controls for marital status and children (models III and VI). Based on existing empirical evidence, we know that there is a strong intergenerational correlation in years of education (see, e.g., Raaum *et al*, 2007). Hence, it seems to be the case that more educated parents encourage more, *but less entrepreneurial*, education among the offspring. However, conditional on the offspring's educational choice, more educated parents also encourage more entrepreneurship. It is evident from Table 6 that family background has a larger influence on sons than on daughters. In particular, while having a parent with entrepreneurship experience raises the entrepreneur rate for sons with more than 5 percentage points, it raises the entrepreneur rate for daughters with less than 2 points.

4.2. Proactive entrepreneurship decisions

For the transition rate analyses, we use annual transition data for all the years 2000-2005. The analysis in this sub-section is conditioned on the initial state being fulltime employment; i.e., we are analyzing the proactive decision to leave a fulltime salaried job for entrepreneurship. On average around 1 percent of the fulltime employees make this transition every year; see Table 2. Existing empirical evidence indicates that many entrepreneurs exploit business ideas encountered in current employment; see Bhide (2000). This implies that the characteristics of an existing work-environment – e.g., in terms of size, productivity, profitability, human capital, and R&D intensity – may affect entrepreneurial spawning.

Workplace characteristics

We assess the impact of workplace and job characteristics on entrepreneurship decisions separately for men and women. We also do separate analyses for relatively large (more than 10 employees) private firms for which accounting data are available. The results are reported in Table 7. We first note that a higher current earnings level – as well as a high earnings level relative to peers (workers with the same education and of roughly the same age (± 2 years)) – typically implies a higher probability of becoming an entrepreneur. These relationships need not have a causal interpretation; they may reflect that workers with high earnings simply tend to be more entrepreneurial than others, ceteris paribus. High firm productivity – as measured by value added per employee – significantly discourages entrepreneurship. A high running surplus, on the other hand, encourages entrepreneurship. We would expect that low output per worker encourages some employees to leave the firm, and that some of those who leave become entrepreneurs. It is also to be expected that workers are more inclined to start their own business if the employees' share of total factor income is low, as the expected gain from being owner is then higher.

Downsizing (defined as a reduction in the number of man-years of at least 25 percent during the base-year) clearly encourages entrepreneurship. Working in a downsizing firm implies roughly a doubling of the probability of becoming an entrepreneur, ceteris paribus. Again, as a large fraction of the employees is forced to leave, some will go for entrepreneurship. It is particularly interesting that the process of creative destruction apparently is two-sided: Not only does creativity cause destruction, as new and innovative firms push obsolescent firms out of the market; destruction also causes creativity, as redundant workers and workers at risk of redundancy seek new ways to support themselves. The level of the local unemployment rate (among persons with the same educational/occupational qualifications), on the other hand, seems to discourage entrepreneurship.

Table 7. The impact of job characteristics, employment conditions, and economic incentives on the probability of making a transition from employment to entrepreneurship
Estimates from linear probability models (OLS) (multiplied by 100)

	Men		Women	
	All firms	Private firms with accounting data and with more than 10 employees	All firms	Private firms with accounting data and with more than 10 employees
Current earnings level (100,000 NOK)	0.040*	0.188***	-0.012	0.032
Current earnings level relative to peers	0.337***	-0.113	0.303***	0.178
Tenure				
Less than one year	0.045	0.141***	0.042*	0.056*
1-2 years	0.092***	0.149***	0.006	0.010
2-5 years	0.016	0.073***	0.008	0.037*
5-10 years	-0.048**	-0.018	-0.001	0.021
More than 10 years	Ref.	Ref.	Ref.	Ref.
Value added per man-year	-0.286***	-0.152***	-0.134***	-0.031
Running surplus per man-year	0.328***	0.146***	0.127***	0.020
Turnover	0.415***	0.348***	0.049***	0.068***
Downsizing (at least 25% of the firm's total man-years)	0.859***	0.758***	0.227***	0.170**
Firm larger than 10 employees	-1.640***		-0.732***	
Firm size (log man-years)	-0.237***	-0.196***	-0.062***	-0.067***
Fraction of employees with PhD education	0.733**	-0.569	0.207	-0.355
Fraction of employees with university education	-0.403***	-0.643***	-0.201***	-0.228**
R&D man-years relative to total man-years[#]		-0.054		0.011
Industry				
Manufacturing	Ref.	Ref.	Ref.	Ref.
Construction	0.769***	0.679***	0.196***	0.184***
Retail, hotel, restaurants	0.251***	0.209***	0.266***	0.160***
Transport, communication	0.115***	0.068***	0.084***	0.062***
Financial services	0.390***	0.155***	0.063***	0.061**
Other private services	0.672***	0.512***	0.242***	0.190***
Publicly provided services	0.242***	0.328***	0.078***	0.130***
Number of observations	3,571,812	2,293,546 (1,072,542[#])	2,263,525	992,837 (308,567[#])

[#] Estimates obtained from separate regressions which only include firms who have participated in Statistics Norway's R&D surveys (all firms with more than 100 employees and a sample of smaller firms).
Additional controls in all regressions: Age, Family background, education, county, marital status, children, own wealth, family wealth, calendar year, corporate body of employer, and dummies for missing accounting variables in the all-firms-regressions (see www.frisch.uio.no/docs/entrepreneurship.html for details)

We find that firm size has a significant negative impact on entrepreneurship among its employees. This is in accordance with the view that small firms provide the best environment for entrepreneurial learning because the employees then work alongside

the firm's manager and/or founder; see Gompers et al. (2005) and Hyytinen and Maliranta (2008). Accordingly, it casts doubt on the popular argument that large firms spawn entrepreneurship due to their rigid wage systems and their inability to compensate their employees for innovative ideas; see Hvide (2009). Note, however, that firm size may operate as a proxy for the scale properties of the production process at the current workplace and thus also for the technology characterizing the most likely startup prospects. Hence, the estimated size effect may be an artifact of the optimal scale distribution across individual entrepreneurship opportunities, and hence have nothing to do with either the current learning environment or the current compensation systems.

There are no clear-cut effects of human capital composition at the workplace. Entrepreneurship seems to be weakly positively affected by the fraction of workers with PhD education, while the fraction with a university degree has a negative impact. Based on a sub-sample of the data – consisting of the employees in larger firms who have participated in the R&D surveys (conducted regularly by Statistics Norway), we also find that the R&D-intensity – measured by the number of man-years devoted to R&D relatively to the total number of man-years in the firm – has no significant effect on entrepreneurship behavior.

Family background and wealth

We assess the impacts of family background, family resources and economic conditions on the basis of the same statistical model. However, for the purpose of examining the roles of these factors, we divide the population into different samples based on marital status rather than firm size. Table 8 presents the results. We assume that three sources of wealth may play distinct roles in the entrepreneurship decision process; own wealth, the spouse's wealth, and the parents' wealth. Since the wealth level in the current year may be directly affected by an entrepreneurship decision, we only allow wealth to affect entrepreneurship with a lag. Being in control of assets clearly tends to affect entrepreneurship positively, particularly for married workers. However, while the entrepreneurship decisions of married women are much more sensitive with respect to own wealth than with respect to the spouse's wealth, married men respond more strongly to the spouse's wealth. The pattern of gender-biased interaction between spouses is further reinforced by

the finding that the spouse's earnings have a stronger effect on male than on female entrepreneurship. It is also of interest to note that unmarried men tend to be *less* entrepreneurial the higher their own wealth.

Table 8. The impact of entrepreneurship opportunities, wealth, and family obligations on the probability of making a transition from employment to entrepreneurship
Estimates from linear probability models (OLS) (multiplied by 100)

	Men		*Women*	
	Married	*Unmarried*	*Married*	*Unmarried*
Wealth (last year, Mill. NOK)				
Own wealth	0.188***	-0.195***	0.102***	-0.002
Spouse's wealth	0.325**		0.033*	
Parent's wealth	0.336***	0.267***	0.127***	0.082***
Earnings (100,000 NOK)				
Own earnings	-0.079	0.186***	-0.079	-0.027
Spouse's earnings	0.023*		0.012*	
Max (parent's education)	0.015***	0.019***	0.003	0.008**
Parent being entrepreneur	0.971***	0.556***	0.441***	0.287***
Local unemployment rate education group	-2.490*	-2.330**	1.310	0.913
Change in local unemployment rate education group	-1.770	-0.069	2.890*	0.580
Previous unemployment experience	-0.296***	-0.361***	-0.085*	-0.114***
Industry experience outside firm	0.100***	0.107***	0.030***	0.050***
Age of youngest child				
No children	Ref.	Ref.	Ref.	Ref.
0-3 years	0.276***	0.327***	0.073*	0.042*
4-6 years	0.357***	0.363***	0.063	0.031
7-16 years	0.275***	0.331***	0.015	0.055**
17 years or more	0.214***	0.293***	0.012	0.040
Number of observations	1,261,080	1,429,124	766,378	889,066

Additional controls in all regressions: Age, Family background, education, industry, county, calendar year, job characteristics (see Table 3). Data restricted to include observations for which at least one parent is still alive

4.3. Reactive entrepreneurship decisions

In this subsection, we examine the transition from unemployment to entrepreneurship. Again, we divide the sample into married and non-married individuals. Given the much smaller population of unemployed individuals, it is difficult to obtain precise estimates for many of the coefficients of interest. We again find that the spouse's wealth and earnings have significant – both in the statistical and the substantive interpretation of this word – impacts on male entrepreneurship, but no impact on female entrepreneurship. And again, we find that the parents' wealth encourages entrepreneurship. Own wealth, however, does not encourage reactive entrepreneurship at all, and for unmarried individuals it

strongly discourages it. Our interpretation of this finding is that own wealth reduces the need for engaging in entrepreneurship as a means to obtaining a decent standard of living.

Table 9. The impact of entrepreneurship opportunities, wealth, and family obligations on the probability of making a transition from unemployment to entrepreneurship (percentage points)
Estimates from linear probability models (OLS) (multiplied by 100)

	Men		*Women*	
	Married	*Unmarried*	*Married*	*Unmarried*
Wealth (last year, Mill. NOK)				
Own wealth	-0.582	-2.060**	0.295	-0.480**
Spouse's wealth	2.370***		-0.076	
Parent's wealth	0.780**	0.433***	0.216*	0.181***
Earnings (100,000 NOK)				
Spouse's earnings	0.323**		0.041	
Max (parent's education)	0.146**	0.047***	0.074***	0.028**
Parent being entrepreneur	3.160***	1.080***	1.180***	0.394***
Local unemployment rate education group	-17.700	-7.340*	-5.160	-0.887
Change in local unemployment rate education group	-32.200	-9.300	-9.340	-3.090
Unemployment duration (months)	-0.046***	-0.018***	-0.009**	-0.006***
Access to some part-time work	2.300***	1.190***	-0.048	-0.013
Participant in active labor market program (ALMP)	-3.220***	-0.558***	-0.705***	-0.149*
Age of youngest child				
No children	Ref.	Ref.	Ref.	Ref.
0-3 years	1.580***	1.350***	-0.329	-0.090
4-6 years	2.270***	1.030***	0.141	0.054
7-16 years	2.510***	1.190***	0.095	0.111
17 years or more	2.620***	0.915***	-0.184	-0.021
Number of observations	39658	170596	70727	147359

Additional controls in all regressions: Age, Family background, education, industry, county, calendar year, job characteristics, and level of UI benefits (see www.frisch.uio.no/docs/entrepreneurship.html for details). Data restricted to include observations for which at least one parent is still alive.

The local education-specific unemployment rate tends to affect entrepreneurship negatively for all groups, although the effect is statistically significant only for unmarried men; see Table 9. Own unemployment duration affects entrepreneurship negatively. Having a foot inside the labor market – in the form of some part time work – has a significant positive impact on entrepreneurship. Hence, while full employment is associated with a lower entrepreneurship propensity than unemployment, *some* employment (underemployment) is associated with higher entrepreneurship propensity than full unemployment. Participation in active labor market programs, on the other hand, correlates negatively with entrepreneurship, perhaps reflecting that these programs often are designed to motivate job *search* rather than job *creation*. We emphasize, however, that neither part-time

work nor program participation are randomly assigned, hence the estimated impacts of these indicators may reflect spurious correlation as well as causality.

5. The performance of new entrepreneurs

This section examines the outcomes of entrepreneurship decisions on the entrepreneurs' economic performance during the subsequent 5 years. The analysis is based on the entrants to entrepreneurship from employment and unemployment, respectively, between October 2000 and October 2001. Figure 4 first takes a look at the distribution of labor market states from 2002 through 2005 for these two groups. It is evident that many entrepreneurship endeavors are short-lived, particularly among those following a period of unemployment. Around 40 percent of these reactive entrepreneurship periods last shorter than one year and 60 percent lasts shorter than four years. However, a significant fraction of the terminated entrepreneurship endeavors are followed by regular employment, suggesting that entrepreneurship may have served as a stepping stone towards employment. Even among the proactive entrepreneurs, 34 percent of the endeavors last shorter than a year and 52 per cent lasts shorter than four years.

To assess the financial rewards to entrepreneurship, we compare the 1997-2006 income paths (including earnings, dividends, capital income etc.) for the 2001-entrepreneurs with control groups of non-entrepreneurs. We construct separate control groups for proactive and reactive entrepreneurs by means of *matching* (with 3 controls for each "treatment"). For this purpose, we have estimated models similar to those presented in Sections 4.2 and 4.3 to account for the transitions to entrepreneurship in 2001, from employment and unemployment, respectively. However, to improve the quality of the matches, we have estimated the employment-entrepreneur transition separately for rather narrowly defined education-age groups (this was not possible for the unemployment-entrepreneur transition due to the much lower number of observations), and also included a more detailed account of past earnings. Hence, we use *exact matching* on education, gender and age-group (in 10-year intervals), and select the three controls on the basis of *nearest neighbor propensity score* within each group. The controls are persons who did not become entrepreneurs in 2001, implying that we do not rule out transitions to

entrepreneurship after 2001. Our two treatment groups consist of 10,424 proactive and 1,623 reactive entrepreneurs, respectively.

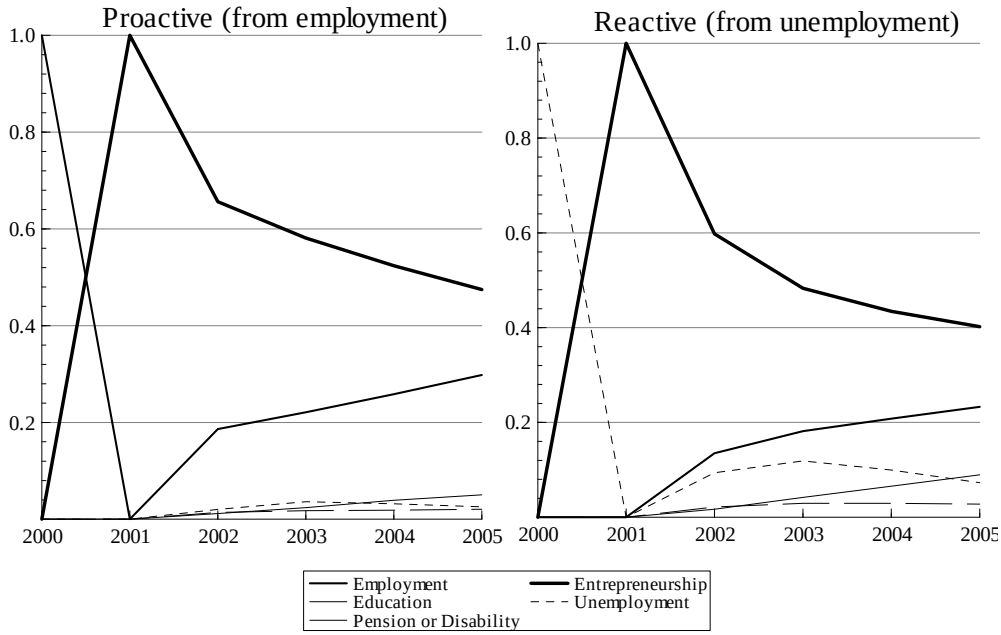

Figure 4. The distribution of main economic activities 2002-2005 for entrants to entrepreneurship in 2001.

Figure 5 presents the income developments for the *proactive* 2001 entrepreneurs and for their matched control group members. Note that we do not condition on survival as entrepreneur in this comparison, hence any changes in the income path resulting from entrepreneurship comprise the direct reward of the entrepreneurial activity as well as any indirect rewards through impacts on the subsequent employment career. The upper panels show median incomes for treatment and controls among men and women, respectively, while the lower panels show the income *differences* between the treatments and the controls at different points of the two income distributions. In addition to the median, we report income differentials at the 10^{th}, the 25^{th}, the 75^{th}, and the 90^{th} percentiles of the income distributions for treatment and controls. Mean incomes are actually not very informative in this case, since they are so strongly affected by a few outliers (which we are not able to match appropriately). The income profiles prior to 2001 are included to facilitate an assessment of the quality of the matches. The treatments and the controls tended to have very similar income profiles prior to the moment of treatment, indicating that the two groups are indeed comparable.

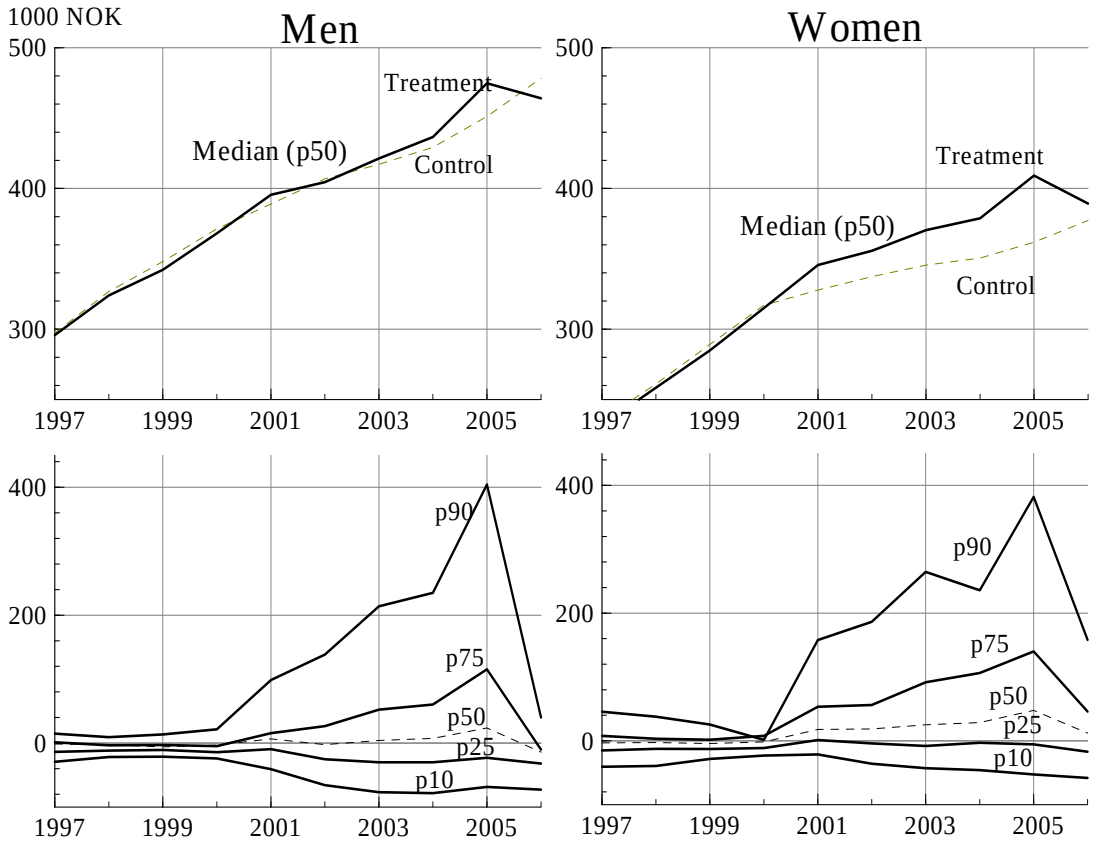

Figure 5. Total annual incomes for the 2001 proactive entrepreneurs (entering entrepreneurship from employment) and a matched comparison group from 1997 to 2006.

There is clearly a marked shift in the income differentials from 2001 and onwards, suggesting that the entrepreneurship decisions in 2001 indeed had a major impact on future income developments. While the median male entrepreneur did slightly better than his control group counterpart the first years after the entrepreneurship decision, the median female entrepreneur did significantly better than her counterpart. The higher female reward does not reflect higher entrepreneurial earnings, however; it rather reflects the poorer earnings development among the employed female non-entrepreneurs (controls). The most conspicuous impact of the entrepreneurship decision for both males and females is to increase income dispersion; see the two lower panels of Figure 5. Hence, the higher incomes experienced for the majority of entrepreneurs are clearly "paid for" in the form of a higher income risk. The upside of entrepreneurship seems to be much larger than the downside, however, and entrepreneurs in the upper quartile of the income distribution receive great financial rewards. Note also that the income differentials reported in

Figure 5 underrate the entrepreneurs' personal financial gains, since the bulk of entrepreneurial earnings are taxed at a lower rate than labor earnings. The entrepreneurs' conspicuous earnings spike in 2005 is clearly related to the fact that this was the last year before an announced 28 percent tax on dividends (above a certain "safe-return" level) was introduced; see Section 3. The tax reform in fact gave the entrepreneurs a strong incentive to reveal their true income in 2005, including any retained profits from the 2001-2004-period. From 2006, however, entrepreneurs again had tax-incentives to retain parts of the profits in the firm. Hence, we expect entrepreneurial earnings to be somewhat under-reported before 2005, to be strongly over-reported *in* 2005, and again become under-reported in 2006.

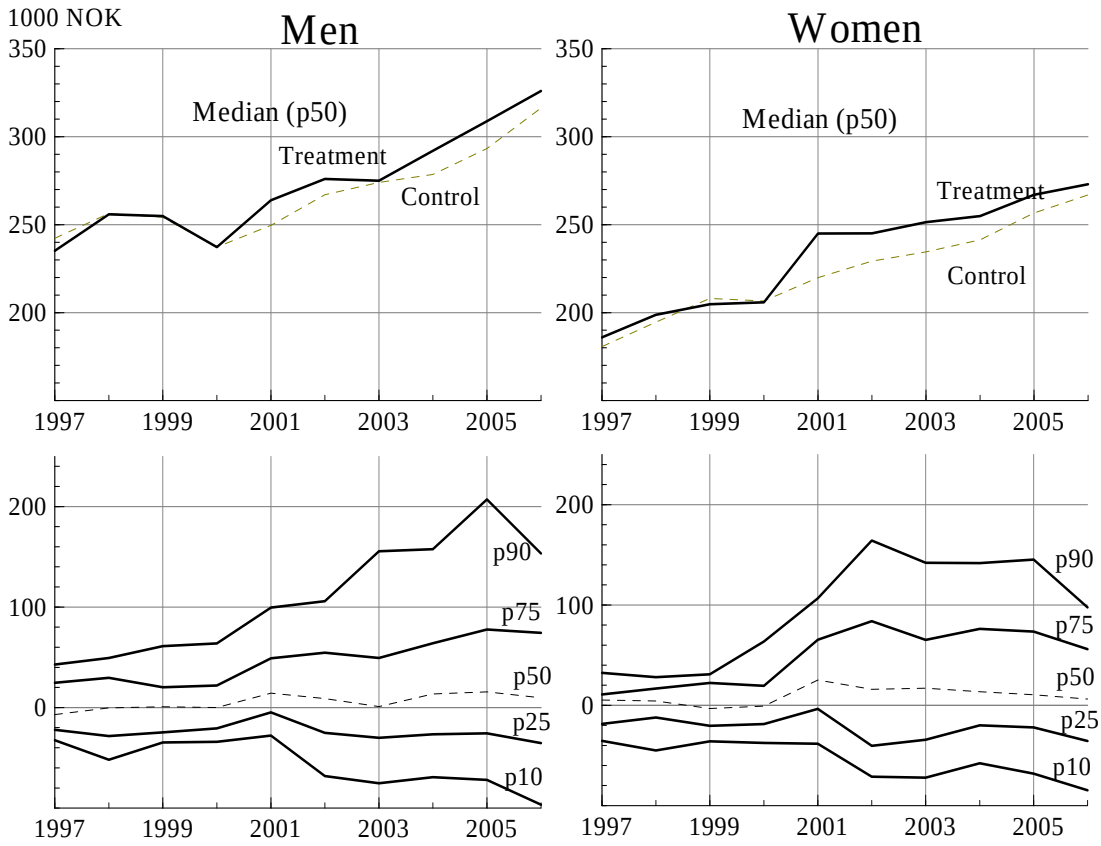

Figure 6. Total annual incomes in for the 2001 reactive entrepreneurs (entering entrepreneurship from unemployment) and a matched comparison group from 1997 to 2006.

Figure 6 presents the income developments for the *reactive* 2001 entrepreneurs together with their matched controls. Unfortunately, we cannot claim the same high quality of these matches. Even though median incomes for the treatment and control groups

were similar in the years prior to the entrepreneurship decision, there were some differences across other parts of the distribution suggesting that the treatment and the control groups differ to some extent; see the two lower panels. Yet, there clearly are significant shifts taking place around the time of the entrepreneurship decision. And again, we find that the median entrepreneur does better than the median non-entrepreneur.

The favorable outcomes of entrepreneurship do not depend entirely on entrepreneurship survival. This point is illustrated in Figure 7, where we show the difference median earnings for the entrepreneurs versus the comparison group members, where the former group is split according to whether they were still entrepreneurs in 2005 or not. For all entrepreneur groups, median earnings seem to rise in the year of entrepreneurship (2001). But while the median surviving entrepreneur experiences a further gain, the non-survivor returns to a median income path similar to the comparison group of non-entrepreneurs. Yet, even among non-survivors, it seems that the upside is larger than the downside; hence, entrepreneurship clearly represents a stepping stone back to regular employment for some unemployed job seekers.

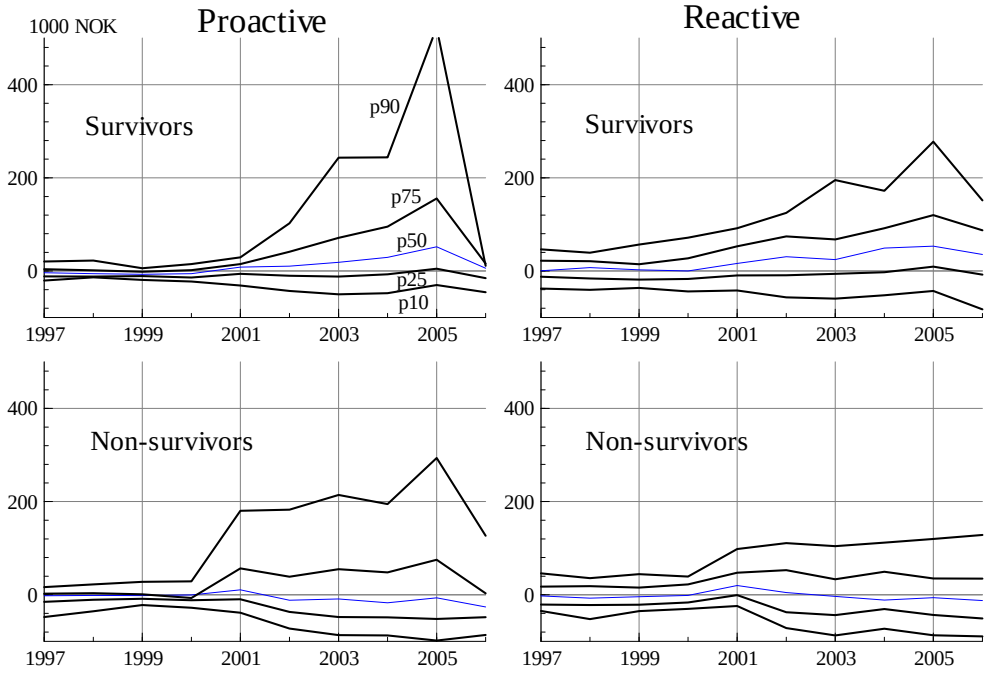

Figure 7. Difference in median earnings 1997-2006 between 2001 entrepreneurs and comparison group members, conditional on the entrepreneurs' status in 2005.

6. Conclusion

In the present paper we use a unique Norwegian matched worker-firm-owner dataset to analyze the origins and outcome of entrepreneurship. We examine both the cross-sectional entrepreneurship propensity in 2005 and the transition from employment and unemployment into entrepreneurship in the period 2000-2005. Our data allow us to apply a wider measure of entrepreneurship than the pure self-employment concept commonly applied in the literature, also encompassing employees in partly self-owned limited liability firms. The objectives of the paper have been to exploit our extraordinarily rich dataset to provide an overview of the key determinants behind entrepreneurship and to reconsider the issue of how entrepreneurial endeavors are rewarded in a welfare state economy like Norway. A key finding is that entrepreneurs tend to be rather generously rewarded. Even though the entrepreneurship decision clearly marks the transition into a high-risk economic environment, we find that the upside tends to be much larger than the downside. And the median entrepreneur experiences a significant rise in pre-tax income (the after-tax gain is even larger, since parts of the entrepreneurial incomes are taxed at a lower rate than earnings). Even among those who fail in entrepreneurship – in the sense that they terminate their entrepreneurship state within five years – we find evidence of substantial gains, although the median entrepreneur in this group does not perform better economically than he/she would have done in the absence of the entrepreneurship endeavor.

Examining the origins of entrepreneurship, we find that the gender differences are huge, despite Norway's reputation as a country with equal opportunities for men and women. In 2005, the average entrepreneur rate was 13.4 percent for men and 4.0 percent for women. And the difference does hardly change at all when we include controls for education, age, marital status and children (the only exception being married couples without children). We also show that occupational qualifications (in the form of narrowly defined educational attainment) have a large impact on the probability of becoming an entrepreneur. The most entrepreneurial occupations are dentists, veterinaries and hairdressers; all occupations where firms tend to be small and hence the fraction of owners to employees is high. Somewhat discouragingly perhaps – at least from a Schumpeterian point of view where the entrepreneur is seen as the economy's innovator – scientists with a PhD are among the *least* entrepreneurial of all education groups.

We also examine how characteristics of a present employer influence the transition rate into entrepreneurship. The transition rate is high if the value added per worker is low, if profit per worker is high, and if the firm is downsizing. Unemployed workers have a higher transition rate to entrepreneurship than employed workers, but their transition rate depends negatively on unemployment in the local labor market.

The entrepreneurship propensity is unambiguously higher the larger is the wealth of the parents and the spouse. Own wealth, however, does not encourage entrepreneurship among the unemployed; hence, for this group, entrepreneurship seems to be generated by necessity rather than by opportunity.

References

Argawal, R., Echambadi, R., Franco, M. A. and Sarkar M. B. (2004). Knowledge Transfer through inheritance: Spinout generation, development and survival. *Academy Management Journal*, Vol. 47, 501-522.

Bhidé, A. W. (2000) *The Origin and Evolution of New Businesses*, Oxford University Press.

Bosma, N., Jones, K. Autio, E., Levie, J. (2008) The 2007 Executive Report. Global Entrepreneurship Monitor (www.gemconsortium.org)

Bratsberg, B., Raaum, O., and Røed, K. (2008) When Minority Labor Migrants Meet the Welfare State. CReAM Discussion Paper Series No. 17/08, UCL, London.

Gompers, P., Lerner, J. and Scharfstein, D. (2005) Entrepreneurial Spawning: Public Corporations and the Genesis of New Ventures, 1986 to 1999, *Journal of Finance*,

Hamilton, B. H. (2000) Does Entrepreneurship Pay? An Empirical Analysis of the Returns to Self-Employment. *Journal of Political Economy*, Vol. 108, No. 3, 604-631.

Hellman, T. (2006). When do Employees Become Entrepreneurs? *Management Science* 53(6), 919-933.

Hvide, H. K. (2009) The Quality of Entrepreneurs. Economic Journal, Vol. 119, 1010-1035.

Hyytinen, A. and Maliranta, M. (2008) When Do Employees Leave Their Job for Entre-

preneurship? Evidence from Linked Employer-Employee Data. *Scandinavian Journal of Economics*, Vol. 110, No. 1, 1-21.

Iyigun, M.F., and Owen, A.L. (1998) Entrepreneurship and human capital accumulations. *American Economic Review* (papers and proceedings) 454-457.

Klepper, S., and Sleeper, S. (2005) Entry by Spinoffs. *Management Science*, Vol 51, No 8, 1291-1306.

Minniti, M., Allen, I. E., and Langowitz, N. (2006) The 2005 Report on Women and Entrepreneurship. Global Entrepreneurship Monitor (www.gemconsortium.org).

OECD (2003) *The Sources of Economic Growth in OECD Countries.* OECD, Paris.

OECD (2005) *Understanding Economic Growth*. OECD, Paris.

OECD (2007) *Employment Outlook 2007*. OECD, Paris.

OECD (2008) *OECD Factbook 2008: Economic, Environmental and Social Statistic.* OECD, Paris.

Parker, S. C. (2004) *The Economics of Self-Employment and Entrepreneurship*. Cambridge University Press.

Raaum, O., Bratsberg, B, Røed, K., Österbacka, E., Eriksson, T., Jäntti, M., and Naylor, R. A. (2007) Marital Sorting, Household Labor Supply, and Intergenerational Earnings Mobility across Countries. *The B.E. Journal of Economic Analysis & Policy (Advances)*, Vol. 7, No. 2, Art. 7.

Santarelli, E. and Vivarelli, M. (2007) Entrepreneurship and the Process of Firms' Entry, Survival and Growth. *Industrial and Corporate Change*, Vol. 16 No. 3, 455-488.

Schumpeter, J. A. (1947) The Creative Response in Economic History. *Journal of Economic History*, Vol. 7, 149-159.

Sleeper, S. (1998) The role of Firm Capabilities in the Evolution of the Laser Industry: The Making of a High-Tech Market. Carnegie Mellon University Ph.D Dissertation.

Van der Sluis, J., Van Praag, M. and Vijverberg, W. (2008) Education and Entrepreneurship Selection and Performance: A Review of the Empirical Literature. *Journal of Economic Surveys*, Vol. 22, No. 5, 795-841.

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