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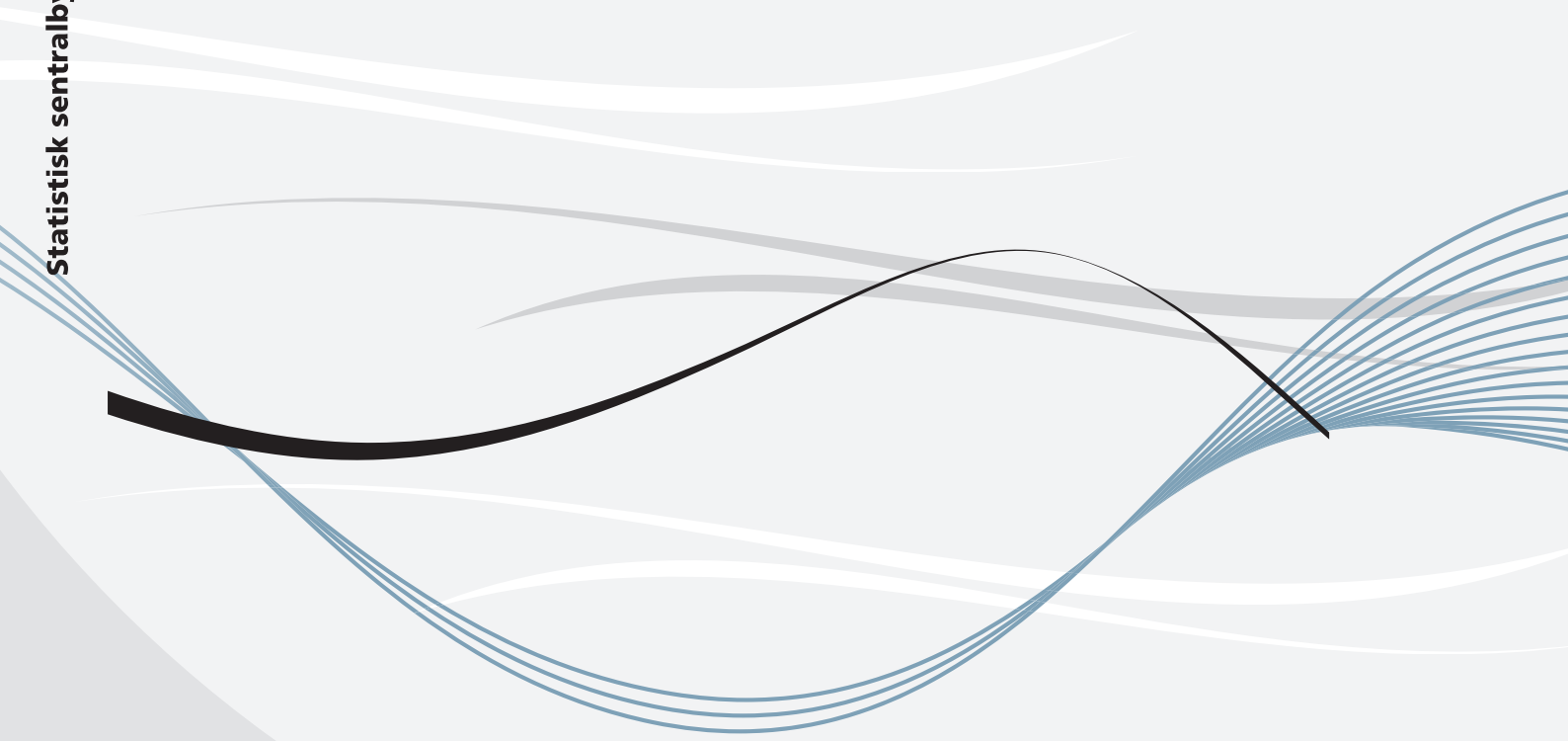

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How persistent are borrowing constraints?

Abstract:

Are investments by new firms constrained by access to financing? If so, are the constraints persistent or do firms overcome their financing problems during the first years of operation? We examine the role of capital constraints by estimating the relation between founders' initial wealth and firm size during the first years of operation. Similar to previous studies, we find a positive impact of entrepreneurs' wealth prior to start-up on the start-up size of entrepreneurial firms, but this effect decreases during the first five years of operation. We also document a high degree of economic mobility among entrepreneurial firms during the first years of operation. This is primarily driven by a disproportional increase in debt financing among the smallest firms, indicating that capital constraints for entrepreneurs are transitory.

Keywords: Entrepreneurship, borrowing constraints, growth

JEL classification: L11

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Sammendrag

Vi undersøker om investeringer i nyetablerte foretak er beskranket av tilgang til finansiering. Våre resultater viser at det kan være vanskelig å få fullfinansiert nye foretak i kapitalmarkedet, men at finansieringssituasjonen bedres i løpet av de første 5 driftsårene. Dette medfører kraftig vekst i de minste foretakene og en høy grad av omrangering målt ved bokført verdi. Mannlige gründere starter gjennomgående større foretak, og med sterkere vekst enn kvinnelige.

1. Introduction

To identify the different aspects of progress in young firms and the determinants of growth is not an easy task. In this paper we examine more closely the evolution of young firms by means of a broad set of empirical measures that provide more insight in the evolution from start-up to a going firm. Our main focus is on the role of possible borrowing constraints for young firms at start-up and to what extent such constraints on size are persistent. More precisely, we examine two research questions: First, how do the founders' resources affect start- up size and early growth in firms, both on average and with regard to the firms' location in the size distribution? Second, to what extent do young small firms catch up with larger ones during the first years of operation?

Government programmes to foster entrepreneurship implicitly or explicitly assume that capital constraints hinder entrepreneurship. Indeed, many studies do find empirical evidence that financial constraints may restrict investments − in particular among young firms. Carpenter and Petersen (2002) find a one-to-one relationship between increments of internal cash flow and small firms' investment and interpret this as an indication that the growth of small firms is constrained by internal finance. DeAngelo et al (2006) find that the propensity to pay dividends is increasing in the earned/contributed capital ratio. This indicates that internal cash flow is scarce and valuable to the firm, causing firms to postpone dividends until they reach a desired level of capital.

These findings are consistent with the model set up in Evans and Jovanovic (1989), who predict that the propensity to start a business should be positively related to founder's wealth. Several empirical studies find a positive relationship between the propensity to start a business and household wealth and conclude that liquidity constraints can be an obstacle for business start-up.[1] On the other hand, when focusing on the incremental impact of household wealth on the probability of starting a business, which should be a decreasing function of wealth according to the Evans-Jovanovic model, Hurst and Lusardi (2004) find no evidence that liquidity constraints represent any obstacle to entrepreneurship.

As pointed out by Cabral and Mata (2003) and Hvide and Møen (2010), the Evans-Jovanovic model also implies that there may be a positive relation between start-up size and entrepreneurs' wealth. However, even if liquidity constraints may lead to a sub-optimal start-up size, access to external capital may improve rapidly as new firms accumulate reputation and prove that they are capable. Martinelli (1997) presents a model where information asymmetries in the capital market are overcome

[1] See Evans and Leighton (1989), Evans and Jovanovic (1989), Holtz-Eakin et al (1994), Fairlie (1999), Quadrini (1999), Gentry and Hubbard (2004).

by reputation building, in such a way that borrowing constraints are relaxed over time. Cabral and Mata (2003) find that young firms' size distribution is skewed with a long right tale, and that this skewness diminishes with firm age in accordance with a theoretical model with decreasing financial constraints over time. On the other hand, the ease of capital constraints during the first years of operation is only one of several possible reasons for the observed decrease in skewness. From a practical point of view, it is self-evident that it takes some time for a new firm to introduce itself to the market, build up a customer base and push the sales. New firms that are founded by inexperienced entrepreneurs may have a large learning potential and may therefore improve their performance rapidly in the first years of operation compared to firms with more efficient entrepreneurs. Using survey data where firms report their financial problems, Angelini and Generale (2008) observe similar effects as Cabral and Mata (2003). Nevertheless, relatively few firms in their data set report that they are constrained. Based on the subsample of self-reported unconstrained firms they conclude that financial constraints cannot be a very important explanation for the observed evolution of the firm size distribution (FSD).

This study departs from previous studies by applying a broader set of empirical tools and by its rich micro data on corporations and owners. Using a data set from 2001 to 2009 on entrepreneurial firms and their individual founders, we follow new firms established between 2001 and 2005 during their first 5 years of operation. These data consist of accounts and balance sheets for corporations, ownership information from the central shareholder register, socio-demographic data, and data on owners' income and wealth from the national income register and education data from a national education database.

Our findings suggest that founders' initial wealth and income are important determinants of firm start-up size but not so important for the increase in assets after start-up. Gender affects both start-up size and growth, with a positive coefficient for male founders. The effect on growth of being male founder is much stronger for the larger firms. We also find that small firms grow faster than larger firms and that there is a remarkable strong degree of mobility among young firms.

The rest of the paper is organized as follows: In section 2 our empirical strategy is outlined. In section 3 our empirical findings are presented and section 4 concludes. The data are described in the data appendix.

2. Empirical strategy

To avoid confusing new start-ups with spinoffs from existing firms, we exclude indirectly held firms from our sample. We also restrict the definition of an entrepreneur to owner-managers in closely held firms that i) have not previously been registered and active as a corporate or non-corporate firm, ii) have a maximum of ten owners and iii) where the entrepreneur holds more than 50% of the firm. We thus consider an entrepreneur to be a person, a founder of a new firm and as having a central role in the business.

Among the references mentioned above, the studies by Cabral and Mata (2003), henceforth CM, and Angelini and Generale (2008) have particular relevance for our study. Using a two-period framework, CM assumes that firms are financially constrained in the first period but not in the second period. Efficiency, θ, is assumed to be constant over time. In the first period, the distribution of firms size is given by $s=\min\{s^*(\theta), w(z)\}$, where s^* is the optimal size given the efficiency of the entrepreneur and w is the maximum size allowed by the entrepreneur's wealth, z. In the second period the distribution of firm size is given by $s^*(\theta)$. Among the small firms in period one, some are small because of binding financial constraints while some are small because of low efficiency. Thus, when financial constraints cease to be binding, more firms will move upwards from the lower part of the FSD. By estimating the FSD by non-parametric methods CM finds that the distribution is skewed to the left at start-up but evolving toward a more symmetric distribution over time. Using regressions on a sample of 515 surviving firms over a 7-year period, they also find empirical support for the view that financial constraints matters for start-up size but not for the size distribution at t+6. Relaxation of financial constraints over time can explain the observed evolution of the FSD.

CM uses age as a proxy for liquidity constraints but the authors admit that age would also be a proxy for efficiency, reflecting labour market experience. CM argues that if the effect of age on size declines over time, this is most likely due to relaxed financing constraints but admits that it cannot be ruled out that the trend in FSD can be driven by other factors. As we briefly mentioned above, firms that are more efficient at start-up and begin with a large scale may loose their advantage over time due to learning by the less efficient firms. We know of no empirical studies on such effects, although Angelini and Generale (2008), who find a similar negative relation between financial constraints and firm size as CM, conclude that firms that report financial constraints are far too few to explain the evolution of the FSD. However, they use a large sample of firms covering a wide age span and do not focus particularly on young, closely held firms or on a particular cohort.

2.1 The theoretical model

The starting point for our empirical analysis is the model which was developed by Evans and Jovanovic (1989). Here, individuals are assumed to have different entrepreneurial abilities and different levels of initial wealth. Borrowing constraints imply that the amount of capital is restricted to a multiple of the entrepreneur's initial wealth. This means that some households with high ability are prevented from starting up at the optimal scale. Since borrowing constraints force low-wealth entrepreneurs to start at a sub-optimal scale, this reduces their returns to entrepreneurship. Hence, there will be a positive correlation between the probability of starting a business and the entrepreneurs' initial wealth. Also, poorer entrepreneurs may be forced to devote a larger share of their personal wealth to the business investment than richer entrepreneurs. Their model also implies a positive correlation between star-up size and initial wealth (even if this is not a central point in their original paper).

In order to clarify the relationship between founders' initial wealth and start-up size, we recapitulate some of the implications of the model. Denote the maximum amount to be invested at start-up by *k*. In the presence of borrowing constraints, the start-up investment is some fraction λ of the entrepreneur's initial wealth, *z*:

(1) $$0 \le k \le \lambda z .$$

(2) $$\lambda \ge 1 .$$

The entrepreneur's net income is

(3) $$\theta k^{\alpha} + r(z - k) = y + r(z - k) ,$$

where θ denotes the entrepreneur's ability, r is the interest rate and y is entrepreneurial income.

Maximizing (3) with respect to capital k gives the first-order condition for an interior solution

(4) $$\theta \alpha k^{\alpha - 1} = r .$$

The optimal (non-constrained) start-up capital is

(5) $$k^* = \left(\frac{\theta\alpha}{r}\right)^{1/(1-\alpha)}$$

The firm's start-up size, given that entry into entrepreneurship is chosen, is then

(6) $$k = \min(\lambda z, k^*).$$

When the future entrepreneur is fully aware of the payouts from entrepreneurship or on the other hand hired work, she will choose to start business if

(7) $$\theta k^{\alpha} + r(z - k) \geq w + rz.$$

The higher the wage income, *w*, the higher ability is required to become an entrepreneur.

From (5) and from (6) we see that start-up size may depend on wealth (constrained entrepreneurs) and on ability (unconstrained entrepreneurs). Also, both the relaxation of financial constraints and an increase in θ, reflecting increased productivity, will lead to growth in *k* over time.

Gender

Entrepreneurship appears to be selective, as males are over-represented among entrepreneurs. Indeed, this is also true for entrepreneurship in Norway. There may also be differences between male and female entrepreneurs regarding the scale of operation and the access to financing. Verheul and Thurik (2001) examine the role of gender for start up size and type of financing and find that gender matters for size but not for the composition of the way businesses are financed. In our study, we use gender among the explanatory variable and also present descriptive evidence of differences in income and wealth between male and female entrepreneurs.

2.2 Empirical specifications

Similar to CM, we assume that if financial constraints are more frequent at start-up than later, more firms will move upwards from the lower part of the FSD than if all firms start at their optimal size. Small firms would on average show higher growth and the effect of the owner's wealth on start-up size should be stronger than its effect on growth (when controlling for its initial effect on start-up size).

Our investigation departs from CM and others by having more detailed information about the firms' founders. By matching individual data with accounts data for firms via the central shareholder register, we are able to utilize information not only about the founder's age but also initial wealth, wage income, education and household size. Of course, better data facilitates more reliable empirical results but the most important improvement in this study, compared to previous studies, is the decomposition of asset growth and its determinants by the firms' position in the FSD and by its source of finance. Similar to CM we focus on young firms, but we expand their analysis that is restricted to one specific cohort by looking at several cohorts. This allows us to control for the effect of time vs. age.

Regressions

We follow CM by estimating the effect of wealth on size at two points in time. However, rather than using number of employees as the dependent variable, we follow Hvide and Møen (2010) and use the book value of total assets. In addition, we run separate regressions with book value of debt and equity as dependent variables.

From (7) we see that the founder's alternative income in non-entrepreneurial activities can serve as a proxy for her entrepreneurial ability. Even if there may be some degree of multicollinearity between wealth and income, both these two variables will improve the reliability compared to the use of founder's age as a proxy variable. Of course, age can have a impact on its own, and is included among the explanatory variables.

We estimate regression models of the following types:

(8) $$\ln(assets_t) = const. + \alpha_1 \ln(wealth_{t-1}) + \alpha_2 \ln(income_{t-1}) + \alpha_3 \ln(age_t) + \alpha_4 D_{gender} + \alpha_5 D_{education} + e_t$$

(9) $$\ln(assets_{t+4}) = const. + \alpha_1 \ln(assets_t) + \alpha_2 \ln(wealth_{t-1}) + \alpha_3 \ln(income_{t-1}) + \alpha_4 \ln(age_t) + \alpha_5 D_{gender} + \alpha_6 D_{education} + e_{t+4}$$

Age refers to the age of the entrepreneur at start-up. The subscript *t* refers to the start-up year of a given cohort of firms, i.e., owners' initial wealth and income is measured one year prior to start-up. In addition we also include owners personal debt at t-1, household size, a dummy variable for the owner having received an inheritance at t-1 and firm-level variables that capture the firms' tangibility and borrowing capacity. The models (8) and (9) are estimated using the book value of total assets as dependent variable and then repeated with the book values of debt and equity as dependent variables.

Running separate regressions with debt and equity as dependent variables will reveal if there are systematic differences with respect to the explanatory variables' effect on the source of financing.

It follows directly that if the FSD becomes more symmetric over time as shown by previous studies, then small firms on average tend to grow faster than large firms (apart from possible selection effects from the exit process). In order to shed more light on the determinants of the size distribution of firms some years after start-up, we estimate (9) by means of quantile regressions in addition to OLS.

Models (8) and (9) are similar to the specification used by CM, with the exception mentioned above that we use book value of assets as the dependent variable and include founders' initial wealth and income among the explanatory variables. Moreover, while CM estimates future size without including the start-up size among the explanatory variables, we include start-up size in (9) in order to control for any wealth-induced boost of size at start-up. However, this comes at the expense of some degree of multicollinearity.

Both sets of regressions are estimated on a balanced panel of surviving firms. We also estimated (8), start-up size, on the full sample of surviving and exiting firms, to check the robustness for selection effects. The results (not reported here) showed that the exclusion of exiting firms does not affect our conclusions.

Growth and changes in the FSD

Where is growth located and how strong is the growth rate in different parts of the FSD? How is growth financed? To what extent does growth imply redistribution of assets among firms and re-ranking of firms? To answer these questions we apply three different measures to give a more comprehensive picture of the evolution of the firm size distribution compared to previous studies:

(I) The expected growth rate in total assets, A, from t to t+4 for firms in quantile q_k, decomposed by source of funds; debt (*De*), net supply of external equity (*Ext*) and internal supply of equity[2] (*Int*):

$$\delta_k = \frac{E[(A_{t+4} - A_t)|q_t = k]}{A_t}$$

[2] Net supply of external equity is defined as new share issues minus dividends over the period t to t+4. Supply of internal equity is defined as the firm's after-tax profits.

$$E\left\{ \left[(De_{t+4} - De_t)/A_t\right] + \left[(Ext_{t+4} - Ext_t)/A_t\right] + \left[(Int_{t+4} - Int_t)/A_t\right] \middle| q_t = k \right\}$$

The measure δ is the growth rates by firm size, decomposed by source of finance. It tells whether small firms grow more, by how much and if this growth relies primarily on the combined resources commanded by the owner, i.e., internal funds plus new equity beyond dividends paid, or if debt financing is available.

(II) The ratio between a firms' expected share of the total assets in a given cohort at time t+4, given a firms' location in quantile q_t =k in the start-up year t, and the firms' expected share of the cohort's total assets at t+4, given its location in the same quantile q_{t+4} =k at time t+4:

$$\gamma_k = \frac{E\left(A_{i,t+4} / \sum_{i=1}^{N} A_{i,t+4} \middle| q_t = k \right)}{E\left(A_{i,t+4} / \sum_{i}^{N} A_{i,t+4} \middle| q_{t+4} = k \right)}$$

(III) The transition probabilities from quantile q_k at time t to quantile q_{k+m} at time t+4:

$$\beta_{k,m} = P\left(q_{t+4} = k + m \middle| q_t = k\right)$$

The measures δ_k and $\beta_{k,m}$ both measure the degree and location of mobility among firms in the same cohort. We focus on relative mobility, i.e. growth in small firms compared to larger firms. The δ's show the degree of asset reallocation through growth, while the β's show to what extent this reallocation implies re-ranking of firms. Given that all firms grow proportionally, the expectation of δ_k is one and the expectation of $\beta_{k,m}$ is zero. The empirical counterparts of these measures are the sample means by quantiles. For the γ's and δ's we report our results by vigintiles, while for the β's we use deciles and quintiles.

3. Results

Below we present our econometric and descriptive evidence. To recapitulate, our two main research questions are:

(1) How do founders' initial wealth, income and gender affect firm size at start-up and in the subsequent 4 - 5 years? Are the estimated effects of the explanatory variables similar for debt and eq-

uity, or different? Are the effects of the explanatory variables uniform across the firm size distribution?

(2) To what extent do small young firms catch up with larger young firms during the first years of operation?

3.1 The determinants of start-up size and growth during the first years of operation

To examine the relation between founders' resources and how firms develop over the first 5 - 6 years, we run regressions on the models (8) and (9) using a log-linear specification, similar to previous studies.[3] The results of these regressions are summarised in tables 1 to 5. As dependent variables, we consider the following set of accounting variables: total assets, debt and total equity. The independent variables are the logs of founders' wealth one year prior to start-up, founders' salaries one year and two years prior to start up plus dummy variables for gender, education and household size.

Similar to previous empirical research[4], we find a positive correspondence between founders' initial wealth and start-up size of entrepreneurial firms (table 1). The estimated parameters are roughly similar for debt, equity and total assets. The effect of initial income is also positive and significant. To the extent that wage can serve as a proxy for non-entrepreneurial earnings, this indicates that ability matters, cf. Evans and Jovanovic (1989) and condition (7). The dummy variable for male entrepreneur is also positive and clearly significant.

In model (9) we aim at measuring the elasticity of assets at t+4 with respect to variation in start-up size at t and the entrepreneurs' initial wealth, income etc. However, the results in table 1 imply that start-up size is correlated with some of the other explanatory variables, in particular wealth. In other words, there will be some multicollinearity involved. In order to indicate how much multicollinearity may affect the results, we show in table 2 how sensitive the key parameters are for different specifications, by including/excluding wealth and start-up size. It appears that the estimated elasticity of size at t+4 with respect to start-up size is not very sensitive for the inclusion/exclusion of initial wealth among the explanatory variables. By contrast, wealth has a positive and strong effect on size at t+4 when start-up-size is omitted but a much smaller partial effect on its own, when we control for its indirect effect via start-up size at t. This has some implications for the interpretation of the quantile regressions below.

[3] Cabal and Mata (2003), Angelini and Generale (2008). The specifications are quite similar to regressions by Hvide and Møen (2010) on Norwegian data, with the extension that we also follow firms some years after start-up.

[4] Cabal and Mata (2003) measure size by the number of employees, which is not directly comparable. Hvide and Møen (2010) find somewhat higher wealth elasticity.

In tables 3 to 5 we examine the effects on growth more closely by estimating the effect of the explanatory variables using both OLS and quantile regressions. The quantile regressions show that the elasticity of assets at t+4 with respect to changes in start-up size at t decreases strongly with the size of the dependent variable, indicating that the largest firms at t+4 have experienced less growth than the smaller firms, after controlling for the owner's resources. The effect of initial wealth is positive but small when we control for start-up size, however slightly higher in the lowest decile than for the rest of the firms. The effect of being male entrepreneur is strongly increasing with the size of the dependent variable, for all sources of finance.

The overall impression from the results in tables 1 – 5 is that initial wealth has a clear positive effect on start-up size. The estimated effects are of the same magnitude for debt and for equity. Apart from the effects via start-up size, initial wealth has a smaller effect on size at t+4 than on size at t, however it is still significant. Being a male entrepreneur has a positive effect on the firms' start-up size as well as its size at t+4. "Male" has a stronger effect on size, the higher position in the FSD at t+4.

An interesting finding is that firms' tangibility, measured by the share of fixed assets in the balance sheet, has a positive impact on start-up size but a negative effect on size at t+4 (when controlling for start-up size). The reason for this could be that firms that invest in fixed assets get access to financing at start-up through collateral and thus need not grow that much, while firms that rely on non-tangible assets must prove themselves worthy before they can get a loan and thus have a delayed path toward the optimal size. The strong negative effect of tangibles is particularly evident for the upper pert in the firm size distribution.

3.2 Growth, equalization over time and mobility

Based on the estimated elasticities of size at t+4 from the quantile regressions, it appears that the large firms at t+4 may have experienced slower growth than smaller firms. In tables 6 to 12 we report the results from a closer examination of the location and financing of growth, based on their ranking at start-up.

Table 6 shows that for every cohort in our sample there is a positive, but rapidly decreasing correlation between a firm's rank in the start-up year t and its rank in the following years. This is an indication of substantial economic mobility among young firms. However, the rank correlation coefficient, which summarizes changes in the entire distribution, says little about the location of mobility, as opposed to δ and β.

Tables 7 to 11 show the distribution of the asset growth decomposed by source for firms ranked according to their size by total assets at start-up, the δ's.

Relative growth is clearly largest for the smallest firms. A large share of this growth is financed by borrowing, in particular among firms in the lowest 2 – 3 deciles. Net capital injections from shareholders are negative, i.e., on average dividends exceed new share issues during the first 5 years of operation.

For all cohorts, there is a very strong and clear tendency that the growth in small firms is disproportionally large. This implies that the smallest firms at t should increase their share of total assets at t+4. This is confirmed by table 12 where we show the estimated γ's by quantile. On average, all firms below the median at t increase their share of total assets at t+4. The average increase is larger the lower the quantile and the tendency is the same for all cohorts. The share of total assets at t+4 held by firms located in the second vignintile at t is around twice as large as the share of total assets they would have controlled, if they had remained in the same vignintile. For the lowest 5 percent, the ratio is even bigger.

In tables 13 to 18 we demonstrate by the β-indicator that the disproportional growth leads to a strong degree of re-ranking of firms. Around 65-70 percent of the firms in the lowest decile and around half the firms in the lowest quintile move to a higher quantile within the first 5 years of operation. Also, firms in the second decile and the second quintile have a much higher propensity to move up than to move down.

The results shown in tables 12 to 18 demonstrate a strikingly high degree of mobility among young firms during the first 5 years of operation and our regressions indicate that owner's wealth is more important for size at start-up than for size at t+4 . The equalisation of firm size over time observed by CM and others do not only imply a narrowing of the differences in size, but also a re-ranking of firms.

These results are consistent with the view that the smallest firms start up at a sub-optimal scale and thus experience a rapid growth in the following years. The results also indicate that some new firms may be small because of borrowing constraints but that the capital market is willing to finance these firms with loans within a rather short time after start-up.

3.3 Tables

Table 1. The determinants of start-up size. OLS

Explanatory variables	Dependent variable		
	Total assets	Debt	Equity
Initial wealth	0,13*	0,13*	0,15*
Initial income	0,02**	0,02**	0,02***
Owner age	-0,00**	-0,00**	-0,00***
Education, upper secondary, basic	0,03	0,03	-0,03
Education, upper secondary, final	-0,08***	-0,09**	-0,08***
Education, post-secondary	-0,12***	-0,14***	-0,12
Education, tertiary, undergraduate	0,04	0,04	-0,01
Education, tertiary, graduate	-0,00	-0,10	0,01
Education, PhD	-0,16	-0,25	0,17
Male	0,18*	0,17*	0,21*
Number of persons in the household	-0,03*	-0,03*	-0,03**
Inheritance dummy	0,06	0,07	-0,03
Owner's initial debt	-0,00	0,00	-0,02***
Firm's tangibility	0,24*	0,42*	-0,18**
Firm's financial strength	-0,01	-0,02	0,04
Year dummy for 2001	-0,08***	-0,08	-0,09***
Year dummy for 2002	0,00	0,02	0,03
Year dummy for 2004	0,03	0,07	-0,02
Year dummy for 2005	-0,03	-0,10**	0,33*
Constant	6,27*	6,07*	4,44*
Adjusted R-squared	0,08	0,07	0,08
Number of observations	3611	3611	3182

* = significant at 1 percent, ** at 5 percent, *** at 10 percent

Table 2. The direct and indirect effect of initial wealth on size at t+4

Dependent variable	Explanatory variables	All owners			Male owners			Female owners		
		(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Total assets at t+4	Initial wealth	-	0,17*	0,06*	-	0,19*	0,06*	-	0,09*	0,04***
	Total assets at t	0,78*	-	0,75*	0,77*	-	0,75*	0,82*	-	0,79*
	Adjusted R-squared	0,38	0,08	0,38	0,36	0,06	0,36	0,40	0,03	0,41
	Number of observations	3043	3037	3037	2500	2495	2495	543	542	542
Debt at t+4	Initial wealth	-	0,13*	0,04*	-	0,15*	0,04*	-	0,06**	0,02
	Total debt at t	0,70*	-	0,69*	0,70*	-	0,69*	0,71**	-	0,70*
	Adjusted R-squared	0,36	0,05	0,36	0,34	0,04	0,34	0,39	0,02	0,39
	Number of observations	3027	3021	3021	2487	2482	2482	540	539	539
Equity at t+4	Initial wealth	-	0,21*	0,12*	-	0,23*	0,14*	-	0,13*	0,05
	Total equity at t	0,59*	-	0,54*	0,59*	-	0,54*	0,58*	-	0,56
	Adjusted R-squared	0,25	0,10	0,26	0,23	0,09	0,25	0,20	0,03	0,20
	Number of observations	2437	2636	2432	2035	2191	2030	402	445	402

* = significant at 1 percent, ** at 5 percent, *** at 10 percent

Table 3. Determinants of size at t+4. Total assets

Explanatory variables	Quantile regressions							OLS
	0.05	0.10	0.25	0.50	0.075	0.90	0.95	
Total assets at t	1,03	0,97	0,98	0,92	0,80	0,66	0,61	0,75*
Initial wealth	0,08	0,05	0,01	0,01	0,02	0,03	0,04	0,06*
Initial income	0,08	0,08	0,01	-0,03	-0,05	-0,01	0,02	0,04*
Owner age	0,00	0,00	0,00	-0,01	-0,01	-0,02	-0,02	-0,01*
Education, upper secondary, basic	-0,09	-0,06	-0,01	0,02	0,01	0,09	0,13	0,01
Education, upper secondary, final	0,05	0,03	0,00	0,02	0,01	0,00	-0,04	0,02
Education, post-secondary	0,04	0,03	0,00	0,00	0,09	0,12	0,10	0,10
Education, tertiary, undergraduate	-0,05	0,00	-0,01	0,03	0,12	0,20	0,21	0,11***
Education, tertiary, graduate	-0,01	-0,03	-0,01	0,05	0,10	0,06	-0,02	0,02
Education, PhD	-0,26	-0,07	-0,04	0,01	-0,02	-0,08	0,49	-0,25
Male	0,02	0,04	0,03	0,10	0,26	0,32	0,41	0,22*
Number of persons in the household	0,02	0,01	0,01	0,00	0,01	0,00	-0,01	0,02**
Inheritance dummy	-0,85	-0,44	-0,09	-0,04	0,18	0,10	0,41	-0,09
Owner's initial debt	-0,03	-0,02	0,00	-0,01	-0,01	0,00	0,00	-0,01
Firm's tangibility	-0,02	-0,03	-0,05	-0,06	-0,15	-0,18	-0,16	-0,21*
Firm's financial strength	0,00	0,01	0,01	0,01	0,02	-0,01	-0,01	0,00
Year dummy for 2002	0,54	0,33	0,13	0,02	-0,09	-0,12	-0,13	0,21*
Year dummy for 2003	0,54	0,33	0,10	-0,04	-0,11	0,08	0,12	0,34*
Year dummy for 2004	0,63	0,40	0,10	-0,06	-0,12	-0,02	0,04	0,35*
Year dummy for 2005	0,77	0,51	0,15	-0,05	-0,08	0,02	0,13	0,37*
Constant	-2,26	-1,18	-0,10	1,12	2,66	3,98	4,40	1,60*
Pseudo/Adjusted R-squared	0,38	0,42	0,47	0,45	0,39	0,34	0,33	0,38
Number of observations	6432	6432	6432	6432	6432	6432	6432	3037

* = significant at 1 percent, ** at 5 percent, *** at 10 percent

Table 4. Determinants of size at t+4. Debt

Explanatory variables	Quantile regressions							OLS
	0.05	0.10	0.25	0.50	0.075	0.90	0.95	
Total debt at t	0,93	0,93	0,96	0,91	0,79	0,66	0,58	0,69*
Initial wealth	0,07	0,04	0,01	0,00	-0,01	0,02	0,03	0,04*
Initial income	0,10	0,08	0,03	-0,02	-0,04	-0,02	0,03	0,04*
Owner age	0,00	0,00	0,00	-0,01	-0,01	-0,02	-0,02	-0,00*
Education, upper secondary, basic	-0,05	-0,05	-0,04	0,01	0,03	0,10	0,08	-0,07
Education, upper secondary, final	0,04	0,01	-0,01	0,02	0,04	0,02	-0,04	0,00
Education, post-secondary	-0,05	-0,16	-0,04	-0,02	0,05	0,16	0,13	-0,01
Education, tertiary, undergraduate	-0,13	-0,08	-0,03	0,02	0,08	0,17	0,16	-0,00
Education, tertiary, graduate	-0,36	-0,21	-0,08	0,01	0,07	0,05	-0,03	-0,20**
Education, PhD	-0,83	-0,81	-0,11	-0,05	-0,12	-0,24	-0,25	-0,60*
Male	-0,06	0,01	0,02	0,09	0,22	0,35	0,40	0,15*
Number of persons in the household	0,01	0,00	0,01	0,01	0,01	-0,01	0,01	0,01
Inheritance dummy	-0,16	-0,40	-0,26	-0,01	0,14	0,59	0,53	-0,12
Owner's initial debt	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Firm's tangibility	0,20	0,07	0,00	-0,08	-0,11	-0,11	-0,10	-0,14***
Firm's financial strength	-0,03	0,01	0,01	0,00	-0,01	0,04	0,00	0,02
Year dummy for 2002	0,56	0,30	0,07	0,01	-0,06	-0,10	-0,14	0,13**
Year dummy for 2003	0,54	0,32	0,06	-0,01	-0,07	0,05	0,17	0,22*
Year dummy for 2004	0,63	0,32	0,10	-0,03	-0,11	-0,06	-0,01	0,19*
Year dummy for 2005	0,66	0,48	0,14	-0,02	-0,07	0,01	0,04	0,18*
Constant	-1,58	-0,72	0,00	1,18	2,71	4,05	4,43	2,14*
Pseudo/Adjusted R-squared	0,33	0,38	0,44	0,44	0,38	0,32	0,30	0,36
Number of observations	6390	6390	6390	6390	6390	6390	6390	3021

* = significant at 1 percent, ** at 5 percent, *** at 10 percent

Table 5. Determinants of size at t+4. Equity

Explanatory variables	Quantile regressions							OLS
	0.05	0.10	0.25	0.50	0.075	0.90	0.95	
Total equity at t	0,94	0,96	0,99	0,84	0,61	0,49	0,42	0,54*
Initial wealth	0,13	0,04	0,01	0,04	0,08	0,11	0,15	0,12*
Initial income	0,15	0,09	-0,01	-0,08	-0,05	-0,04	-0,02	0,06*
Owner age	0,00	0,00	0,00	-0,01	-0,01	-0,01	-0,02	-0,00
Education, upper secondary, basic	0,09	0,03	0,00	0,07	0,14	-0,05	-0,16	0,00
Education, upper secondary, final	0,26	0,07	0,00	0,03	0,05	-0,03	-0,23	0,05
Education, post-secondary	0,22	0,04	0,02	0,10	0,07	0,06	-0,14	0,05
Education, tertiary, undergraduate	0,14	0,06	0,01	0,10	0,23	0,20	0,06	0,17**
Education, tertiary, graduate	0,00	0,00	0,02	0,11	0,19	0,24	0,04	0,09
Education, PhD	-0,63	-0,17	-0,07	0,05	0,25	0,09	0,26	-0,62**
Male	0,08	0,06	0,02	0,19	0,29	0,33	0,23	0,24*
Number of persons in the household	0,01	0,00	0,01	0,01	0,03	0,02	-0,01	0,02***
Inheritance dummy	-0,55	-0,20	-0,06	-0,16	-0,05	-0,22	-0,12	-0,27
Owner's initial debt	-0,03	-0,01	0,00	-0,02	-0,03	-0,02	-0,02	-0,02
Firm's tangibility	0,09	0,03	0,00	0,00	0,04	-0,03	-0,05	0,00
Firm's financial strength	-0,02	0,01	0,00	0,00	0,00	0,03	0,01	-0,02
Year dummy for 2002	0,51	0,32	0,03	-0,01	-0,11	-0,08	-0,11	0,25*
Year dummy for 2003	0,43	0,26	0,01	-0,11	-0,10	0,07	0,11	0,37*
Year dummy for 2004	0,56	0,34	0,01	-0,15	-0,13	0,05	0,09	0,43*
Year dummy for 2005	0,62	0,43	0,03	-0,10	0,02	0,14	0,09	0,39*
Constant	-2,57	-1,20	0,10	1,73	3,50	4,48	5,26	1,81*
Pseudo/Adjusted R-squared	0,37	0,40	0,42	0,36	0,29	0,26	0,26	0,26
Number of observations	5291	5291	5291	5291	5291	5291	5291	2432

* = significant at 1 percent, ** at 5 percent, *** at 10 percent

Table 6. Spearman's rank correlation for firms by cohort

Start-up year (t)	t+1	t+2	t+3	t+4
2001 N=904	0.90	0.83	0.78	0.71
2002 N=992	0.89	0.81	0.73	0.67
2003 N=949	0.86	0.74	0.69	0.61
2004 N=1051	0.84	0.77	0.69	0.65
2005 N=1138	0.86	0.74	0.68	0.65

Table 7. Sources of growth from t to t+4 by quantiles (δ_k). 2001

Quantile	Mean(Δdebt)	Mean(Δdint)	Mean(Δdext)	Mean(Δtotal)
1 (5%)	127.86 %	66.17 %	-51.48 %	142.55 %
2 (10%)	173.05 %	28.66 %	-41.21 %	160.49 %
3 (15%)	81.53 %	50.11 %	-37.08 %	94.56 %
4 (20%)	88.09 %	87.77 %	-66.19 %	109.67 %
5 (25%)	101.73 %	37.69 %	-49.31 %	90.11 %
6 (30%)	118.04 %	74.16 %	-48.89 %	143.31 %
7 (35%)	51.91 %	44.93 %	-33.72 %	63.11 %
8 (40%)	73.77 %	63.14 %	-41.37 %	95.55 %
9 (45%)	60.69 %	64.95 %	-41.76 %	83.88 %
10 (50%)	70.45 %	30.28 %	-22.63 %	78.10 %
11 (55%)	47.07 %	62.91 %	-46.52 %	63.46 %
12 (60%)	56.43 %	52.52 %	-38.05 %	70.90 %
13 (65%)	52.06 %	46.32 %	-30.11 %	68.26 %
14 (70%)	40.30 %	27.60 %	-19.35 %	48.55 %
15 (75%)	36.30 %	47.00 %	-36.02 %	47.28 %
16 (80%)	27.94 %	42.44 %	-30.84 %	39.53 %
17 (85%)	20.75 %	40.85 %	-23.41 %	38.19 %
18 (90%)	14.25 %	33.26 %	-14.42 %	33.09 %
19 (95%)	28.53 %	43.16 %	-38.78 %	32.92 %
20 (100%)	14.26 %	40.27 %	-14.77 %	39.75 %
All	34.07 %	43.36 %	-26.78 %	50.65 %

Table 8. Sources of growth from t to t+4 by quantiles (δ_k). 2002

Quantile	Mean(Δdebt)	Mean(Δdint)	Mean(Δdext)	Mean(Δtotal)
1 (5%)	302.04 %	112.90 %	-29.35 %	385.59 %
2 (10%)	181.84 %	30.72 %	-28.49 %	184.08 %
3 (15%)	95.03 %	75.95 %	-46.02 %	124.95 %
4 (20%)	148.90 %	134.39 %	-90.00 %	193.28 %
5 (25%)	144.52 %	75.14 %	-27.81 %	191.85 %
6 (30%)	88.92 %	109.90 %	-41.94 %	156.89 %
7 (35%)	116.31 %	70.30 %	-46.81 %	139.79 %
8 (40%)	95.57 %	59.27 %	-28.96 %	125.87 %
9 (45%)	148.79 %	47.09 %	-29.39 %	166.49 %
10 (50%)	102.37 %	57.38 %	-29.20 %	130.55 %
11 (55%)	79.38 %	40.78 %	-16.75 %	103.41 %
12 (60%)	69.86 %	73.30 %	-45.22 %	97.95 %
13 (65%)	18.27 %	65.76 %	-37.35 %	46.68 %
14 (70%)	62.93 %	45.60 %	-31.91 %	76.62 %
15 (75%)	41.65 %	63.79 %	-34.47 %	70.97 %
16 (80%)	22.46 %	53.39 %	-28.21 %	47.65 %
17 (85%)	32.43 %	27.40 %	-13.19 %	46.64 %
18 (90%)	48.10 %	50.01 %	-29.06 %	69.05 %
19 (95%)	38.40 %	38.02 %	-22.68 %	53.73 %
20 (100%)	17.16 %	29.41 %	-19.09 %	27.49 %
All	48.31 %	46.07 %	-26.44 %	67.94 %

Table 9. Sources of growth from t to t+4 by quantiles (δ_k). 2003

Quantile	Mean(Δdebt)	Mean(Δdint)	Mean(Δdext)	Mean(Δtotal)
1 (5%)	193.77 %	90.68 %	-14.68 %	269.77 %
2 (10%)	262.78 %	68.76 %	-17.68 %	313.85 %
3 (15%)	208.94 %	71.18 %	-13.57 %	266.56 %
4 (20%)	219.08 %	115.69 %	-60.35 %	274.43 %
5 (25%)	181.89 %	214.26 %	-36.89 %	359.26 %
6 (30%)	130.83 %	38.80 %	-2.32 %	167.30 %
7 (35%)	94.17 %	86.39 %	-33.75 %	146.82 %
8 (40%)	96.63 %	85.37 %	-25.33 %	156.66 %
9 (45%)	141.34 %	64.86 %	-23.73 %	182.46 %
10 (50%)	110.66 %	59.92 %	-21.10 %	149.47 %
11 (55%)	135.35 %	36.10 %	-7.71 %	163.74 %
12 (60%)	68.65 %	86.57 %	-40.88 %	114.34 %
13 (65%)	43.84 %	48.48 %	-23.88 %	68.45 %
14 (70%)	80.26 %	72.36 %	-33.06 %	119.56 %
15 (75%)	33.91 %	58.46 %	-34.56 %	57.81 %
16 (80%)	70.21 %	41.90 %	-18.95 %	93.16 %
17 (85%)	42.94 %	33.91 %	-11.63 %	65.22 %
18 (90%)	75.00 %	43.17 %	-17.43 %	100.74 %
19 (95%)	33.05 %	43.97 %	-21.29 %	55.72 %
20 (100%)	63.21 %	71.86 %	-39.70 %	95.37 %
All	74.30 %	62.07 %	-28.16 %	108.21 %

Table 10. Sources of growth from t to t+4 by quantiles (δ_k). 2004

Quantile	Mean(Δdebt)	Mean(Δdint)	Mean(Δdext)	Mean(Δtotal)
1 (5%)	547.97 %	90.45 %	-29.94 %	608.48 %
2 (10%)	257.92 %	104.31 %	-38.37 %	323.86 %
3 (15%)	163.35 %	71.01 %	-37.84 %	196.52 %
4 (20%)	76.65 %	64.54 %	-24.77 %	116.43 %
5 (25%)	76.16 %	79.20 %	-28.63 %	126.73 %
6 (30%)	109.91 %	94.77 %	-22.80 %	181.88 %
7 (35%)	138.02 %	105.17 %	-34.75 %	208.44 %
8 (40%)	79.67 %	39.51 %	-15.62 %	103.57 %
9 (45%)	110.02 %	100.26 %	-26.84 %	183.44 %
10 (50%)	41.40 %	66.03 %	-22.86 %	84.57 %
11 (55%)	142.90 %	48.04 %	-4.20 %	186.75 %
12 (60%)	46.40 %	47.49 %	-13.23 %	80.65 %
13 (65%)	88.94 %	67.43 %	-24.11 %	132.26 %
14 (70%)	42.77 %	50.42 %	-23.68 %	69.51 %
15 (75%)	82.59 %	99.17 %	-17.90 %	163.86 %
16 (80%)	30.44 %	53.91 %	-27.18 %	57.16 %
17 (85%)	39.07 %	51.28 %	-13.02 %	77.33 %
18 (90%)	14.14 %	52.37 %	-21.75 %	44.77 %
19 (95%)	7.34 %	35.85 %	-16.41 %	26.79 %
20 (100%)	49.47 %	49.13 %	-13.71 %	84.89 %
All	56.92 %	56.87 %	-18.50 %	95.29 %

Table 11. Sources of growth from t to t+4 by quantiles (δ_k). 2005

Quantile	Mean(Δdebt)	Mean(Δdint)	Mean(Δdext)	Mean(Δtotal)
1 (5%)	172.28 %	106.37 %	-6.64 %	272.00 %
2 (10%)	228.01 %	87.11 %	-10.31 %	304.81 %
3 (15%)	217.74 %	97.64 %	-37.98 %	277.39 %
4 (20%)	110.45 %	57.10 %	-37.49 %	130.05 %
5 (25%)	140.60 %	99.51 %	-6.43 %	233.68 %
6 (30%)	136.76 %	68.24 %	-20.93 %	184.07 %
7 (35%)	98.57 %	93.44 %	-43.36 %	148.65 %
8 (40%)	104.55 %	74.58 %	-25.77 %	153.36 %
9 (45%)	63.80 %	108.26 %	-36.74 %	135.33 %
10 (50%)	92.37 %	95.40 %	-34.67 %	153.10 %
11 (55%)	67.35 %	86.25 %	-38.38 %	115.22 %
12 (60%)	66.47 %	80.55 %	-28.32 %	118.69 %
13 (65%)	68.99 %	74.59 %	-30.47 %	113.10 %
14 (70%)	61.43 %	69.13 %	-21.01 %	109.56 %
15 (75%)	65.32 %	64.04 %	-24.33 %	105.04 %
16 (80%)	52.00 %	42.56 %	-20.93 %	73.63 %
17 (85%)	42.21 %	47.09 %	-18.40 %	70.90 %
18 (90%)	43.90 %	56.40 %	-18.06 %	82.24 %
19 (95%)	30.18 %	57.54 %	-22.79 %	64.92 %
20 (100%)	26.73 %	46.50 %	-15.10 %	58.13 %
All	54.24 %	60.75 %	-21.60 %	93.40 %

Table 12. The ratio between firms' share of the cohorts' total assets at t+4, contingent on ranking at t, and their share of total assets at t+4, contingent on the ranking at t+4 (γk). By vignintile

Quantiles	2001	2002	2003	2004	2005
1 (5%)	1.45	3.49	2.14	3.23	2.27
2 (10%)	1.78	2.09	1.86	2.25	2.06
3 (15%)	1.34	1.36	2.26	1.62	2.08
4 (20%)	1.51	1.64	1.40	1.19	1.20
5 (25%)	1.24	1.93	1.70	1.31	1.87
6 (30%)	1.64	1.39	0.96	1.64	1.70
7 (35%)	1.06	1.44	1.21	1.52	1.29
8 (40%)	1.23	1.35	1.35	1.02	1.37
9 (45%)	1.19	1.67	0.99	1.29	1.31
10 (50%)	1.03	1.46	0.89	1.27	1.36
11 (55%)	1.26	1.15	1.21	1.04	1.11
12 (60%)	1.07	1.24	1.34	1.24	1.12
13 (65%)	1.23	0.86	0.88	0.93	1.07
14 (70%)	1.02	1.01	1.05	0.95	1.05
15 (75%)	0.86	0.96	0.76	1.38	1.15
16 (80%)	1.00	0.86	0.89	0.89	0.91
17 (85%)	0.85	0.82	0.79	0.87	0.95
18 (90%)	0.88	0.98	1.00	0.72	1.00
19 (95%)	0.92	0.89	0.67	0.65	0.84
20 (100%)	0.92	0.76	1.00	0.94	0.74

Table 13. Transitions from t to t+4 by deciles (β_k). 2001

From\To	1	2	3	4	5	6	7	8	9	10
1	0.39	0.22	0.14	0.08	0.13	0.01	-	0.03	-	-
2	0.18	0.26	0.24	0.08	0.09	0.06	0.07	0.01	0.02	-
3	0.13	0.14	0.23	0.11	0.12	0.09	0.04	0.08	0.02	0.02
4	0.11	0.14	0.16	0.17	0.14	0.08	0.08	0.08	0.04	-
5	0.08	0.10	0.11	0.17	0.07	0.17	0.12	0.10	0.06	0.02
6	0.06	0.08	0.08	0.17	0.17	0.13	0.12	0.04	0.10	0.06
7	0.02	0.02	0.03	0.11	0.17	0.17	0.16	0.16	0.06	0.08
8	0.04	-	0.02	0.07	0.09	0.19	0.19	0.13	0.20	0.07
9	-	0.03	-	0.03	0.02	0.09	0.16	0.26	0.26	0.14
10	-	-	-	0.01	-	0.02	0.04	0.10	0.22	0.60

Table 14. Transitions from t to t+4 by deciles (β_k). 2002

From\To	1	2	3	4	5	6	7	8	9	10
1	0.39	0.13	0.19	0.08	0.06	0.06	0.02	0.02	0.02	0.02
2	0.22	0.25	0.12	0.13	0.09	0.06	0.07	0.04	-	0.01
3	0.09	0.17	0.18	0.15	0.12	0.11	0.11	0.05	0.02	0.01
4	0.11	0.12	0.10	0.13	0.13	0.14	0.08	0.08	0.07	0.03
5	0.07	0.15	0.13	0.18	0.14	0.10	0.05	0.04	0.06	0.06
6	0.04	0.08	0.11	0.11	0.12	0.16	0.11	0.13	0.10	0.04
7	0.04	0.05	0.13	0.08	0.14	0.16	0.17	0.09	0.10	0.04
8	0.03	0.02	0.03	0.08	0.12	0.16	0.15	0.20	0.13	0.08
9	-	0.03	-	0.05	0.08	0.03	0.18	0.22	0.23	0.17
10	0.01	-	-	-	-	0.03	0.06	0.12	0.26	0.52

Table 15. Transitions from t to t+4 by deciles (β_k). 2003

From\To	1	2	3	4	5	6	7	8	9	10
1	0.30	0.18	0.19	0.08	0.07	0.06	0.06	0.01	0.05	0.01
2	0.22	0.15	0.17	0.09	0.07	0.07	0.11	0.04	0.07	0.01
3	0.16	0.19	0.14	0.08	0.15	0.14	0.02	0.04	0.04	0.04
4	0.12	0.11	0.18	0.20	0.05	0.13	0.09	0.07	0.02	0.03
5	0.08	0.10	0.15	0.18	0.17	0.11	0.06	0.04	0.05	0.05
6	0.05	0.11	0.09	0.13	0.19	0.12	0.07	0.11	0.08	0.05
7	0.04	0.05	0.07	0.09	0.13	0.12	0.17	0.16	0.11	0.05
8	0.01	0.05	0.02	0.10	0.10	0.14	0.20	0.12	0.15	0.10
9	0.02	0.03	0.01	0.03	0.05	0.08	0.15	0.24	0.23	0.14
10	-	0.01	-	0.01	0.02	0.02	0.08	0.15	0.21	0.49

Table 16. Transitions from t to t+4 by decile (β_k)s. 2004

From\To	1	2	3	4	5	6	7	8	9	10
1	0.36	0.21	0.11	0.07	0.06	0.02	0.07	0.02	0.06	0.01
2	0.16	0.22	0.22	0.16	0.06	0.07	0.05	0.02	0.02	-
3	0.18	0.17	0.19	0.16	0.13	0.06	0.02	0.06	0.03	-
4	0.09	0.22	0.10	0.10	0.11	0.15	0.12	0.04	0.06	0.02
5	0.08	0.07	0.19	0.16	0.20	0.09	0.08	0.09	0.02	0.02
6	0.05	0.08	0.10	0.15	0.20	0.08	0.09	0.07	0.09	0.08
7	0.05	0.05	0.05	0.12	0.10	0.18	0.13	0.13	0.11	0.07
8	0.02	-	0.04	0.05	0.12	0.18	0.15	0.14	0.16	0.12
9	0.02	-	0.01	0.04	0.03	0.09	0.17	0.27	0.23	0.14
10	0.01	0.01	-	-	0.01	0.08	0.10	0.13	0.18	0.47

Table 17. Transitions from t to t+4 by deciles (β_k). 2005

From\To	1	2	3	4	5	6	7	8	9	10
1	0.35	0.22	0.12	0.09	0.03	0.09	0.03	0.03	0.03	-
2	0.20	0.27	0.15	0.13	0.06	0.05	0.04	0.10	-	0.01
3	0.18	0.15	0.21	0.19	0.08	0.03	0.06	0.06	0.03	0.01
4	0.08	0.19	0.19	0.17	0.10	0.05	0.07	0.07	0.03	0.05
5	0.05	0.06	0.18	0.07	0.17	0.16	0.12	0.09	0.07	0.02
6	0.05	0.03	0.11	0.11	0.22	0.15	0.12	0.09	0.10	0.04
7	0.04	0.06	0.05	0.11	0.10	0.19	0.20	0.12	0.09	0.04
8	0.06	0.03	-	0.11	0.19	0.12	0.15	0.11	0.13	0.12
9	-	0.02	0.01	0.01	0.04	0.15	0.17	0.20	0.22	0.17
10	0.01	-	-	0.01	0.01	0.03	0.05	0.12	0.28	0.50

Table 18. Transitions from t to t+4 by quintiles (β_k). 2001-2005

From\To	1	2	3	4	5
2001					
1	0.52	0.27	0.14	0.06	0.01
2	0.27	0.33	0.22	0.13	0.05
3	0.16	0.26	0.27	0.20	0.12
4	0.05	0.12	0.31	0.33	0.20
5	0.02	0.02	0.07	0.29	0.61
2002					
1	0.49	0.27	0.14	0.08	0.03
2	0.25	0.28	0.25	0.16	0.07
3	0.17	0.26	0.27	0.17	0.13
4	0.07	0.17	0.28	0.30	0.17
5	0.02	0.03	0.07	0.29	0.59
2003					
1	0.42	0.27	0.13	0.12	0.06
2	0.29	0.30	0.24	0.11	0.07
3	0.18	0.27	0.29	0.13	0.12
4	0.08	0.14	0.25	0.33	0.21
5	0.03	0.03	0.09	0.31	0.54
2004					
1	0.48	0.28	0.11	0.08	0.05
2	0.33	0.28	0.22	0.12	0.06
3	0.14	0.30	0.29	0.17	0.11
4	0.07	0.14	0.29	0.28	0.23
5	0.02	0.03	0.10	0.34	0.51
2005					
1	0.52	0.25	0.12	0.10	0.02
2	0.30	0.38	0.13	0.13	0.06
3	0.10	0.23	0.35	0.21	0.12
4	0.09	0.13	0.30	0.29	0.19
5	0.01	0.01	0.11	0.27	0.59

4. Discussion and conclusion

Similar to several previous studies, our empirical evidence shows that the founders' initial wealth has some positive effect on the start-up size of entrepreneurial firms. This could possibly indicate borrowing constraints. There is a tendency that the correlation between initial wealth and size continues during the first years of operation but apart from the effect of the immediate boost at start-up, the importance of the owner's wealth for firm size is much weaker after some years.

By means of quantile regressions and quantile decomposition of growth we document that small firms grow much faster than larger firms. Also, some of the determinants of future size have different effects

depending on where firms are located in the FSD; tangibility has a positive effect on start-up size, but a negative effect on size at t+4, in particular for large firms. Even if collateral matters for start-up size, it appears that high growth relative to start-up size is associated with a low share of fixed assets and a location in the lower part of the FSD. The positive effect of male entrepreneur on size at t+4 is increasing in firm size.

While internal funds and borrowing on average are roughly equally important as sources of growth in the balance sheets when we consider the entire sample of firms, debt is far more important for the group of small firms. Thus, irrespective of what causes the observed effect of wealth on start-up size, it appears that any constraints on borrowing at start-up to a large extent are overcome during the first 5 years of operation. We also demonstrate that the disproportional growth of the smaller firms implies a high degree of re-ranking, meaning that there is a high degree of economic mobility among entrepreneurial firms.

The relatively strong growth of small firms is first and foremost driven by an increase in debt financing, showing that capital market imperfections can be overcome by the building-up of reputation and credibility over time. The main insight from this paper is that even if capital market imperfections may be constraining size at start-up, one should not underestimate the role of the banks as a provider of capital and the capital market's ability to support firms once they are going. This suggests that government programmes to promote entrepreneurship by easing the access to financing should last as short as possible and concentrate on the difficult start-up phase, but leave it to the capital market to evaluate and finance going businesses.

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Appendix: Data and descriptive statistics

We use data from different registers that cover the entire population of firms and owners. Below, we describe the different data sources and provide some descriptive statistics on the key variables.

Data

The Central Register of Establishments and Enterprises

Unit: Company/enterprise of all organisational forms and establishment.

In this register, a firm (company) is defined as "the smallest legal unit comprising all economic activities engaged in by one and the same owner". A firm can consist of one or more (physical) establishments, which are geographically local units conducting economic activity. The register contains ID-number, name and address of each unit, founding date, status (sleep/active), the company ID of establishments and some economic information (turnover, number of employees).

Account statistics

Unit: Companies (only joint stock)

Every joint-stock company in Norway is obliged to send in their accounts (current accounts and balance sheets) to a public register every year. Members of consolidated groups (subsidiaries and parent company) send in their own accounts.

The Shareholder Register

Unit: Individuals and companies.

The shareholder register contains ownership data for every Norwegian joint-stock company. For the purpose of this paper, we have computed ultimate ownership shares on three levels of ownership: Direct (level 1), indirect (level 2) and indirect via two segments. This procedure ensures that we cover 85 percent of total ownership of non-listed firms in Norway[5], and captures both direct ownership as well as investors that operate through holding companies and investment companies.

The Directorship Register

Unit: Individuals and companies.

The register of directorship gives information of every individual's appointments such as member of the board, chairman of the board, general manager etc. In combination with ownership information from the shareholder register, this provides a basis for the identification of founders and insiders.

[5] The remaining 15 percent are foreigners, institutions and individual ownership chains through more than two company segments

The Register of Employers and Employees

Unit: Companies (all organisational forms) and individuals

The employer-employee register contains information about each individual employee's contract start and end, wages and (contractual) working hours. Each record contains an identification of employee and firm.

The tax register for individuals

Unit: Individuals

The tax register gives information about taxable income and wealth based on individual tax returns.

The National Education Database (register, total population)

Unit: Individuals

The national education database contains a six-digit number for each individual. The leading digit describes the educational level of the person (length of education). The remaining 5 digits describe the field of education.

Descriptive statistics

Table A.1 Number of firms by year and gender of founder

Start-up year	Male	Female	Total
2001	1 046	266	1 312
2002	1 089	272	1 361
2003	1 027	298	1 325
2004	1 189	299	1 488
2005	1 217	338	1 555

Table A.2 Firm characteristics at start-up. By year and gender

Start-up year	Male				Female			
	Total assets	Debt	Equity	Operating income	Total assets	Debt	Equity	Operating income
2001. Mean	2 467,22	2 108,27	339,17	209,66	2 008,59	1 729,99	269,20	36,43
Median	1 212,00	1 064,50	144,50	67,00	893,50	759,50	118,50	16,50
2002. Mean	2 025,73	1 785,58	225,59	155,59	1 590,04	1 414,05	169,33	104,99
Median	1 133,00	994,00	146,00	86,00	873,00	735,00	115,50	34,00
2003. Mean	2 095,48	1 811,35	284,13	233,21	1 424,64	1 275,07	149,57	86,85
Median	1 092,00	990,00	135,00	70,00	884,50	773,00	118,00	13,50
2004. Mean	2 230,84	1 945,47	285,67	212,35	1 239,02	1 133,52	105,64	60,04
Median	1 223,00	1 104,00	135,00	77,00	879,00	802,00	108,00	16,00
2005. Mean	1 980,50	1 548,64	480,74	281,63	1 219,86	1 037,07	220,43	89,43
Median	1 107,00	888,00	217,00	99,00	821,50	690,00	159,00	24,50

Table A1. Main owner's wealth at firm start-up. By year and gender

Start-up year	Male	Female
2001. Mean	1 736,00	1 029,68
Median	581,01	264,19
2002. Mean	1 544,63	1 062,98
median	551,03	305,53
2003. Mean	1 364,64	445,58
Median	485,93	196,58
2004. Mean	1 742,93	373,75
Median	457,87	213,63
2005. Mean	1 126,80	400,00
Median	441,01	171,74
Pooled mean	1 499,61	641,66
95 % Confidence intervals	1 358,45	499,35
	1 640,76	783,97
t-value for difference in means	5,93	

Table A2. Main owner's income at firm start-up. By year and gender

Start-up year	Male	Female
2001. Mean	238,03	160,97
Median	242,52	155,12
2002. Mean	235,91	161,31
Median	254,90	163,47
2003. Mean	243,10	161,59
Median	264,41	173,64
2004. Mean	244,13	177,32
Median	253,08	195,25
2005. Mean	232,27	159,57
Median	233,62	164,12
Pooled mean	238,61	164,15
95% Confidence intervals	232,61	156,77
	244,60	171,52
t-value for difference in means	11,93	

Table A.3 Owners by start-up year and education level at firm start-up. Percent

	Male					Female				
Education level (years)	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005
No education	0.19	0.28	0.10	0.17	0.08	0.00	0.00	0.34	0.00	0.00
Primary school (1-7)	0.57	0.00	0.10	0.00	0.16	0.00	0.00	0.00	0.00	0.00
Lower sec (8-10)	19.22	18.55	17.92	18.92	16.60	17.67	20.22	24.16	21.07	23.08
Upper sec - basic (11-12)	17.59	16.35	15.00	14.72	11.83	24.81	19.49	20.13	15.72	14.50
Upper sec - final (13+)	34.32	36.82	36.90	37.93	42.07	29.32	33.09	32.21	33.11	32.84
Post-sec, non-tertiary (14+)	4.68	5.14	6.33	5.47	5.09	3.01	2.57	1.68	3.68	1.18
Tertiary, undergraduate (14-17)	15.68	14.51	15.38	15.31	13.23	14.29	17.65	14.77	20.74	20.41
Tertiary, graduate (18-19)	6.41	6.70	5.84	4.54	7.56	9.02	4.78	5.70	4.01	5.92
Phd	0.48	0.64	0.58	0.34	0.58	0.00	0.74	0.00	0.00	0.00
Unknown	0.86	1.01	1.85	2.61	2.79	1.88	1.47	1.01	1.67	2.07

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