CAN WE EXPLAIN THE CORRELATION BETWEEN FIRM GROWTH AND LEGAL FORM?

– THE ROLE OF RISK WILLINGNESS AND HUMAN CAPITAL

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The role of risk willingness and human capital

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Introduction

This note has new firm growth as its main focus. Specifically, we look into whether the links between firm performance and legal form found in earlier studies can be explained by cultural attributes or human capital of firm owners.

Previous studies on new firm performance have, without any exception we know of, found that limited liability firms exhibit higher employment growth rates than similar sole proprietorships and partnerships with unlimited liability. Contrary to this, the empirical results of the effect of limited liability on survival are very mixed and seem to be sensitive to the length of period studied and the sample of firms used. In table 1 we summarize the most important findings from previous research on the relationship between legal form and firm performance.

There are two main hypotheses given in the literature for the relationship between legal status and growth. The first links a firm's legal status to its owner's propensity to take on risky projects. The hypothesis is that, because under limited liability the owner is not personally liable for the debts incurred by the firm, he or she will tend to undertake riskier projects than owners of unlimited liability firms. Riskier projects are by definition more likely to fail, and also more likely to have higher returns than less risky projects if they succeed. According to this hypothesis, in an empirical analysis we would expect to find that, all else equal (a) limited liability firms become insolvent and exit the market more frequently than unlimited liability firms, and (b) among surviving firms limited liability firms have higher growth rates. An important caveat to point out here is that the owner of a limited liability firm can also be personally liable for debts incurred by the firm when he uses his personal property as collateral to obtain loans for the firm. This could in principle dampen the effect of legal form on performance.

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Table 1: Key results on the relationship between legal form and new firm performance

Study	Country	Dependent variable	Results
Storey et al. 1994	UK	• Use of bank loans and overdrafts • Employment growth rate	Limited liability companies were more likely to have received bank financing and exhibited a higher growth rate in terms of number of employees.
Harhoff et al. 1998	Germany	• Survival • Employment growth rate	Limited liability firms have higher growth and higher insolvency rates than comparable firms under full liability.
Almus and Nerlinger 1999	Germany	• Employment growth rate	Limited liability firms achieve significantly higher growth rates than unlimited liability firms, this is true regardless of the technological intensity of the firm.
Mata and Portugal 2002	Portugal	• Exit	Limited liability firms are less likely to exit than unlimited liability firms.
Davidsson et al. 2002	Sweden	• Employment growth rate	Limited liability firms exhibit higher growth than unlimited liability firms.
Frankish et al. 2013	UK	• Survival	Limited liability companies have higher survival rates than partnerships and sole proprietorships.
Coad et al. 2012	UK	• Survival (6 years)	Unlimited liability firms have higher chances of survival in year 6 than limited liability firms. Although curiously they generally had lower survival rates in the previous years.
Gjerløv-Juel, and Dahl. 2013	Denmark	• Survival • Employment growth • Probability of being a high-growth firm in year 5.	Limited liability firms survive longer, have higher growth rates, and are more likely to become high-growth firms than unlimited liability firms.

Source: own construction based on the cited sources

The second hypothesis postulates that limited liability firms are more likely to receive bank financing because bankers interpret their legal status as a sign of “seriousness” in business (Storey et al 1994). This would imply that unlimited liability firms are credit constrained compared to limited liability firms, which would then lead to a lower capacity to invest and therefore to grow.

A related hypothesis is that banks are more willing to lend to individuals with higher levels of human capital, because they expect them to be more successful in running the firm. Storey et al (1994) find that owners of new firms are more likely to receive bank financing if the firm is organized as a limited liability company and if they have a degree. Cassar (2004) finds that while limited liability is positively related to the use of bank financing by new firms, the estimated coefficient looses significance when controlling for the owner’s years of experience and whether he or she has a tertiary education degree, although these two variables are not statistically significant in the model. Based on these findings, we derive a third hypothesis: that an individual’s human capital is correlated with both firm legal form and firm growth so that the observed relationship between legal form and new firm growth is driven by omitted variable bias.

In this note we focus on the first and third hypotheses. We use self-reported data on attitudes (including risk attitudes) and human capital of the owners in our sample, as well as data from the Danish registers, to test whether the link between legal form and firm performance persists after controlling for the owner's risk willingness and human capital. To measure human capital we use both register information about firm owners' years of education and years of experience as firm owners, employers and directors, and self reported information on owners' competencies. Our measure of risk willingness is self reported. Our analysis is purely descriptive and does not attempt to establish causality between firm performance and legal form or firm performance and owner's attributes.

The rest of the note is structured as follows: we first describe the firms in our survey and their owners, focusing in the key differences according to firm legal form; we then present the growth measures used in our analysis and how the different types of firms performed according to them; lastly, we present the results of the analysis about the relationship between growth, legal form and owner's attributes.

Data sources

Most of our data is derived from a survey conducted in the spring of 2013. The survey was administered to two different random samples: one of limited liability firms and one of unlimited liability firms. The samples were drawn from the population of new firm registrations between the years 2009 and 2011 that had at least half a million Danish kroner in turnover in their second calendar year of operation. For unlimited liability firms, who were identified both by the firm's registration number (CVR) and the owner's personal identification number (PNR) the sample was also restricted to individuals aged 18 to 60. Limited liability firms were only identified by the firm's CVR.

In total, the survey elicited 1009 and 635 responses from unlimited and limited liability firms respectively. However, for the analysis carried out in this note we removed the responses for firms whose owners stated not being involved in the daily operations of the firm or that they became owners of the firm before 2009. The latter was to avoid confusing new firms with mere reorganizations: a firm will for example change registration number when changing its legal status, or when its owners decide to split up. Our final sample for analysis after removing these firms consists of 753 unlimited liability firms and 403 limited liability firms. Table 2 shows how surveyed firms were distributed according to legal form and first year of operation. In terms of firm legal form, sole proprietorships represented the largest group among surveyed firms, followed by limited liability companies and partnerships.

Table 2: Distribution of surveyed firms according to starting year and legal form

	Sole proprietorship	Partnership	Limited Co.	N
First year				
2009	28%	21%	31%	324
2010	33%	33%	36%	393
2011	39%	46%	33%	439
N	580	173	403	1156

Source: authors' calculations

It is important to point out that our sample still contains firms that existed before 2009 but had different owners than the surveyed. Surveyed firm owners were asked to choose which option of the ones presented in Table 3 described their firm better. Most described their firms as new and independent firms, followed by purchases of an existing firm, spinoffs, inherited firms and lastly, franchises. Owners of partnerships were more likely to describe their firms as purchases of an existing firm, and owner's of sole proprietorships were less likely to describe their firms as spinoffs, but otherwise, the distribution is mostly even across the three legal forms.

Table 3: Firm type

Type of firm	Sole proprietorship	Partnership	Limited Co.
Spinoff	6%	11%	14%
Inherited firm	4%	7%	2%
New and independent firm	71%	51%	69%
Purchase of an existing firm	19%	28%	14%
Franchise	0.3%	2.3%	1.5%
Non-profit firm	0.2%	0.0%	0.0%
No answer	0.3%	0.6%	0.0%
N	580	173	403

Source: authors' calculations

In addition to the survey responses, we had access to data from the Danish register linked to the firms' CVR number for all the firms in our sample. It is in this way that we obtained data on employment from 2009 to 2011 and sales from 2009 to mid 2012.

For owners of unlimited liability firms and a subset of owners of limited liability firms we were also able to link personal data from the Danish register to our analysis[2]. This included data on labor market history, years of education and family characteristics.

The survey was administered through web and telephone interviews and divided into 6 blocks of questions including for example questions about (a) attitudes and motivations in working life; (b) ambitions and expectations for the firm; (c) the owner's human capital; (d) the firm's type, primary source of finance and lack of competencies in different areas; and (e) the owner's perceptions about their parents' influences on their own career. For the current analysis, we used responses from blocks (a), (c) and (d).

Descriptive statistics by legal form

We focus on the differences between private limited companies on one hand and sole proprietorships and partnerships on the other. Table 4 outlines the most important formal differences between the four main types of legal form in Denmark. In addition to the owner being liable only for the capital contributed to the firm, limited liability firms have more statutory requirements in terms of governance and reporting than unlimited liability firms, they require a minimum level of startup capital and they are subject to corporate taxation rules exclusively.

[2]Owners of limited liability firms were only identified by their CVR number; in addition to this we had access to self-reported information on gender, current municipality of residence, age and municipality of birth from our survey. To establish the link to the persons register data (which identifies observations by PNR number) , we used the database of employees of limited liability firms for the years 2009 to 2011 and matched the observations for owners of limited liability firms to the observations in this database first by CVR number, then by gender, current municipality, age and municipality of birth. In this way we were able to identify 149 limited liability firm owners.

Table 4: Formal differences between limited liability and unlimited liability firms.

	UNLIMITED LIABILITY		LIMITED LIABILITY	
	Sole proprietorship	**Partnership**	**Private limited company**	**Public limited company**
No. of owners	1	Min. 2	Min. 1	Min. 1
Owner decisions	Made by the owner alone	Made by the owners. Important decisions require unanimity	Made by the general meeting by more than half the votes or by a majority of two-thirds	Made by the general meeting by more than half the votes or by a majority of two-thirds
Management	No statutory requirements	No statutory requirements	Executive Board and possibly Board of Directors or Supervisory Board	Executive board and Board of Directors or Supervisory Board
Liability	Personal and unlimited	Personal, unlimited, joint and several	Limited to the contributed company capital	Limited to the contributed company capital
Startup capital	No statutory requirements	No statutory requirements	Min. 25%of the company capital; however always min. DKK 80,000	Min. DKK 500,000 with paying-in of min. 25% of the company capital
Bookkeeping	Yes	Yes	Yes	Yes
Annual report	No	No, if the owners are physical persons	Yes, and must be published	Yes, and must be published
Tax	Personal taxation rules, corporate taxation rules and capital gains tax rules	Personal taxation rules, corporate taxation rules and capital gains tax rules	Corporate taxation rules	Corporate taxation rules
Legislation and rules	General laws and rules, for example the Danish Bookkeeping Act (Bogføringsloven), the Danish Business Tax Act (Virksomhedsskatte-loven)	General laws and rules, for example the Danish Bookkeeping Act, the Danish Business Tax Act	The Danish Companies Act (Selskabsloven) + general laws and rules, for example the Danish Bookkeeping Act	The Danish Companies Act (Selskabsloven) + general laws and rules, for example the Danish Bookkeeping Act

Source: ERST (2010) http://startvaekst.dk/file/75120/oversigt_virksomhedsformer.pdf

Distribution of surveyed firms by industry branch and region

In terms of economic branch of employment, the greatest concentration of surveyed firms appears in the trade and transport branch, followed by other business services and construction. Partnerships are the most common legal form among agricultural firms in the survey, and the most uncommon legal form among firms in the information and communication branch. Otherwise, the branch distribution does not show any significant differences between the three different legal forms.

The higher incidence of partnerships among agricultural firms is also reflected in the regional distribution of surveyed firms. Compared to limited companies and sole proprietorship, partnerships are more common in Jutland and less common in the Capital Region, Zealand and Southern Denmark. Otherwise, there are no significant differences in the regional distribution of the three types of legal forms.

Owner's characteristics

Table 5 (split according to data source) summarizes the personal characteristics of firm owners, according to the three different legal forms of ownership present in the survey. The data is self reported data for some variables, and data from the Danish registers for other variables, in the case of the latter variables, we have a significantly less observations for the owners of limited liability companies.

Tables 5: Characteristics of firm owners, by firms' legal form of ownership

Table 5a	Sole proprietorship		Partnership		Limited company		Total	
Variable	N	Mean	N	mean	N	Mean	N	mean
Age in 2008	580	33.64	173	32.09	403	38.17	1156	34.99
Female	577	0.26	170	0.31	403	0.18	1150	0.24
Self financed	574	0.72	170	0.63	402	0.77	1146	0.72
Bank loan	574	0.22	170	0.33	402	0.17	1146	0.22

Source: authors' calculations based on survey data

Table 5b	Sole proprietorship		Partnership		Limited company		Total	
Variable	N	Mean	N	mean	N	Mean	N	Mean
Employed in same branch as firm in 2008	576	0.59	172	0.59	149	0.58	897	0.59
Non Danish	577	0.13	170	0.10	149	0.04	896	0.11
Single	577	0.22	170	0.29	149	0.15	896	0.22
Number of children	577	1.34	170	1.26	149	1.26	896	1.31
Unemployed in 2008	579	0.02	171	0.02	149	0.00	899	0.02
Years of education	569	13.47	169	13.49	149	13.93	887	13.55
Labor market experience 1980-2008								
Ever sole proprietorship	579	0.12	171	0.23	149	0.28	899	0.16
Ever employer	579	0.05	171	0.12	149	0.13	899	0.08
Ever director	579	0.09	171	0.05	149	0.19	899	0.10
Years as sole proprietorship (conditional)	67	2.45	40	3.78	41	2.22	148	2.74
Years as employer (conditional)	30	3.30	21	5.62	19	4.79	70	4.40
Years as director (conditional)	54	2.94	9	1.67	28	4.57	91	3.32

Source: authors' calculations based on persons' register data

Table 5c	Sole proprietorship		Partnership		Limited company		Total	
Variable	N	mean	N	mean	N	Mean	N	Mean
Employees in first year	580	1.66	173	1.95	403	1.64	1156	1.70

Source: authors' calculations based on firms' register data

The most salient trends are the following:

- Owners of limited liability companies are older, and there is a lower percentage of females and immigrants compared to the group of owners of sole proprietorships and partnerships.
- There is a higher proportion of married individuals in the group of owners of limited liability companies, although on average they have less children than the other two groups

- Owners of limited liability companies were more likely to say that their firm was principally financed through the owners' own funds, while owners of partnerships were more likely to say that the firm's principal source of finance are bank loans.
- Compared to owners of sole proprietorships and limited liability companies, owners of partnerships are less likely to have worked in the same branch of their current firm in 2008.
- Owners of limited liability firms were less likely to be unemployed in 2008 compared to the other two groups.
- Owners of limited liability have on average studied for slightly longer than owners of unlimited liability firms, although this difference is not statistically significant.
- Looking at the labor market experience between 1980 and 2012, owners of limited liability companies are more likely to have experience as owners of sole proprietorships and as directors than the owners of the other kinds of firms. Owners of partnerships are the most likely to have experience as employers.
- Conditional on having experience as owners of sole proprietorships, employers or directors, owners of limited liability firms have the most years of experience as directors while owners of partnerships have the most years of experience as owners of sole proprietorship firms and as employers.
- Partnerships are the largest among the three types of firms in terms of number of employees in their first year of operation.

Survey results

Table 6 summarizes the answers to the survey questions included in our analysis. It compares the answers of owners of limited liability companies to the answers of owners of unlimited liability firms (sole proprietorships and partnerships). A plus sign indicates that owners of limited liability firms were significantly more likely to answer that they strongly agreed with statements (a) through (c) and significantly more likely to answer "to a high degree" for statements (d) through (m) respectively. An equal sign indicated that there are no statistically significant differences between the answers of owners of limited and unlimited liability firms.

Overall, the key trends are the following:

- Owners of limited liability companies are more likely to report that they are willing to take risks in their working life.
- There are no significant differences in the self-reported level of ambition and competitiveness between the two groups.
- Owners of limited liability companies report having more professional experience, as well as more experience in business development, sales and marketing and leadership. They also report more frequently that they have many different work competencies.
- On average, owners of limited liability companies have started more firms than owners of sole proprietorships and partnerships.

Table 6: Attitudes, human capital; differences according to firm legal form

	Limited liability compared to unlimited liability firms
To what degree do you agree with the following statements when it comes to your working life	
(a) No matter what I do, I set the highest standards for myself	=
(b) I am only satisfied when I am number 1	=
(c) I am willing to take risks	+
To which degree do you possess the following:	
(d) Professional experience	+
(e) Knowledge of the industry	=
(f) Experience in business development	+
(g) Sales and marketing experience	+
(h) Leadership experience	+
(i) A relevant education	=
(j) Specialist knowledge	=
(k) Many different work competencies	+
(l) A large professional network	=
(m) Support from family and friends	=
Apart from your current firm, how many firms have you started (either alone or with partners)	+

Source: authors' calculations

To sum up, our descriptive statistics point in the direction that owners of limited liability are more risk willing and have higher levels of human capital than the owners of unlimited liability firms. For instance they appear to have more leadership experience and experience as firm owners both according to self reported and register data.

Growth performance by legal form

The studies reviewed in Table 2 all use data on employment growth and/or survival as measures of performance. As we only have data for surviving firms, we follow this literature and focus on employment growth; however, we also look into the differences in sales growth of firms according to their legal form.

We have yearly employment data for 2009 through 2011 defined as the number of full time employees in November. We can only calculate employment growth for firms whose first year of operation is either 2009 or 2010. We follow Davis and Haltiwanger (1992) and calculate employment growth as the ratio of the absolute difference in employees between 2011 and the first year of operation and the average number of employees in the period. This leaves us with 800 observations on employee growth (see table 7).

To calculate sales growth we use bi-annual VAT data, which we pool together so that for each firm there is as many observations as the number of complete semesters it appears in the data from 2009 to mid 2012. This means that for firms starting in the first semester of 2009 we have sales data for 6 or 7 semesters, whereas for firms starting in the last semester of 2011 we have data for 1 or 2 semesters only. We calculate sales growth as the difference in the natural log of sales for alternate semesters. We have a total of 2232 observations on sales growth (table 7).

Table 7 presents descriptive statistics for employment and sales growth for the three types of firm in our sample. On average, limited liability companies had a higher employment growth rate than unlimited liability firms in our sample, which is in line with the findings of previous literature on the subject. The difference in employment growth between partnerships and sole proprietorships is not statistically significant. The average sales growth rate for limited liability companies was lower than that for unlimited liability firms, but this difference is not statistically significant.

Table 7: Employment growth and sales growth by legal form

Variable	Legal form	N	mean	se(mean)	median
Employment growth	Sole proprietorships	354	0.43	0.06	0.00
	Partnerships	93	0.48	0.15	0.00
	Limited companies	270	0.84	0.08	0.28
Sales growth	Sole proprietorships	1057	0.55	0.03	0.27
	Partnerships	267	0.55	0.06	0.28
	Limited companies	696	0.50	0.04	0.27

Source: authors' calculations

Results

We use the measures on employment growth and sales growth presented in the previous section as dependent variables in our analysis of the effect of legal form on new firm performance. Apart from our key independent variables, legal form, owner's risk willingness and human capital we control for other firm characteristics and owner characteristics, which have been described in detail in the previous sections.

For the analysis that uses employment growth as a dependent variable we include only those firms that had 2009 or 2010 as their first year of operation and estimate an OLS model. For the analysis that uses sales growth as the dependent variable we estimate an OLS with clustered standard errors by firm. Furthermore we add period dummy variables to account for the business cycle.

For each of the models we estimate 2 different specifications: in the first specification we include only survey variables, as they are the only that are available for the majority of our sample. We then add additional variables from the Danish registers in the second specification. Table 8 lists all control variables used in our analysis and table 9 summarizes the results, reporting only the variables which are found to be statistically significant at the 5% level.

We report the results for the preferred specification only, which for both models turned out to be the specification without any data from the registers. In both cases, the inclusion of register variables also resulted in a significant drop in the number of observations and in the alteration of some coefficients compared to the original specification. We therefore estimated the first specification using the restricted sample from the second specification and found indications of sample selection bias. Overall the results for employment and sales growth are significantly different.

We find that limited liability status is positively and significantly correlated with employment growth, even after accounting for all of our control variables. This replicates the results from the literature summarized in table 1. Based on these results we reject both our hypotheses: neither risk attitudes nor the owner's human capital seem to be driving the observed correlation between firm's legal form and performance in terms of employment growth.

In addition to legal form, a few other variables were significant in explaining employment growth. First, compared to new and independent firms, spinoffs had a significantly higher employment growth rate. Second, the size of the firm on the first year, measured as number of employees, appeared with a negative sign in our regression. Third, firms starting in 2010 had significantly higher growth rates than firms starting in 2009.

In the sales growth model, limited liability status appears with a negative sign and is significant at the 5 per cent confidence level. We do not know of previous studies that look into the connection between legal form and sales growth, and our results probably indicate that the relationship between firm performance and legal form is not as evident when using sales growth as a measure of firm performance instead employment growth, at least in this short 3-4 year period. It is possible that a longer period of time would reveal a different pattern, especially in light of results such as Coad (2010), which finds that employment growth is often succeeded by sales growth.

Risk willingness appears with a positive sign, and is significant at the 5% level. Given that our sample is a sample of surviving firms, this result is in line with the hypothesis about risk willingness and performance, according to which firms with more risk-willing owners fail more often than firms of less risk-willing owners, but have higher returns on average if they do survive. None of the human capital measures are significant in our model.

In addition to risk-willingness, firm type appears as a significant explanatory variable in the sales growth model, with inherited firms, purchases of existing firms and non-profit firms growing significantly less than new and independent firms. Furthermore, as in the employment model, firm size in terms of number of employees in the first calendar year of operation appears with a negative sign. This is also the case for the owner's age.

Table 8: Control variables

Dependent Variable		**Source**
Firm growth	Employment growth / Sales growth	Register data (firms)
Independent Variables		
Owner's attitudes	Ambitious, competitive, risk willing	Survey
Owner's competencies	Professional experience; Knowledge of the industry; Experience in business development; Sales and marketing experience; Leadership experience; A relevant education; Specialist knowledge; Many different work competencies; A large professional network; Support from family and friends	Survey
Owner´s characteristics	Age, age squared, gender, origin, dummy for single, number of children, unemployed 2008, employed in same branch as firm in 2008, years of education, dummy for serial entrepreneur, ever entrepreneur/ employer/director 1980-2008, number of years as entrepreneur/ employer/director 1980-2008, region	Survey and register data (persons)
Firm's characteristics	Branch, legal form, type of firm, main form of financing, employees in the first year of operation , first year of operation	Register data (firms)

Table 9: Summary of results

Independent variable	Employment growth	Sales growth
Limited liability	+	-
Risk willingness		+
Spinoff (compared to new and independent firm)	+	
Inherited firm (compared to new and independent firm)		-
Purchase of existing firm (compared to new and independent firm)		-
Non profit firm (compared to new and independent firm)		-
Employees in first year of operation	-	-
Start year 2010 (compared to 2009)	+	not included
Owner's age		-
Number of observations	703	2000
Number of clusters		743
R-squared	0.140	0.093

Source: authors' calculations

Conclusion

The main focus of this note was to test whether the link between legal form and firm performance which has been generally observed in the literature of new firm growth persists after controlling for the owner's risk willingness and human capital. First, we find that owners of limited liability firms are more willing to take risk and possess more human capital (measured by previous experience as managers and directors) than owners of unlimited liability firms.

Second, we estimated two different models of firm performance, one using employment growth as the dependent variable, the other using sales growth. The results were significantly different for both models. We find that limited liability status is positively and significantly correlated with employment growth, even after accounting for all of our control variables. Risk willingness and owner's human capital were not significant in the estimation. Based on these results we reject our hypotheses: neither risk attitudes nor the owner's human capital seem to be driving the observed correlation between firm's legal form and performance in terms of employment growth. We do not observe the same pattern in our sales growth model, in fact we find that limited liability firms perform worse than other firms and that the owner's risk willingness is positively and significantly correlated with sales growth. Given that our sample is a sample of surviving firms, this last result is in line with the hypothesis about risk willingness and performance, according to which firms with more risk-willing owners fail more often than firms of less risk-willing owners, but have higher returns on average if they do survive.

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VÆKST GENNEM VIDEN

DEA er en ideologisk uafhængig tænketank, der arbejder for, at Danmark øger sin værdiskabelse og vækst samt tiltrækker internationale virksomheder gennem viden om uddannelse, forskning og innovation.

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