How Entrepreneurial Experiences Foster Crises Resilience - Survival and Performance of New Ventures and Incumbents

Pontus Braunerhjelm[‡] and Emma Lappi[†]

ABSTRACT

This paper estimates the relationship between entrepreneurial human capital (EHC) of employees in new firms and incumbents and their resilience to major global crises using individual and firm level data for 1996-2016. EHC is measured as employees' experience being entrepreneurs. We use longitudinal register data for Sweden covering the IT-crisis 2001-2003 and the Great Recession 2008-2009. The results show that having employees with an entrepreneurial background decreases the probability of exiting especially for the new ventures, albeit the effect on firms differs across these two crises. We elaborate with alternative measures of EHC, distribute it on occupational function, educational level and the reason for employees quitting their previous entrepreneurial endeavors (closures, mergers and acquisitions). In addition, we implement three different estimation techniques. Our results remain robust to all these alterations. Besides providing new empirical insights, we argue that our findings are of theoretical interest as well as having practical and policy implications.

Keywords: financial crisis, firm performance, resilience, human capital, entrepreneurial capital

JEL codes: D22, E32, L25, L26

[‡]Professor in Entrepreneurship and International Business, Division of Entrepreneurship and Innovation, KTH Royal Institute of Technology, INDEK, SE-100 44 Stockholm, Sweden and Swedish Entrepreneurship Forum, Grevgatan 34, SE-114 53 Stockholm, Sweden
E-mail: pontus.braunerhjelm@indek.kth.se
[†] Center for Entrepreneurship and Spatial Economics (CEnSe), Jönköping International Business School, P.O. Box 1026, SE-551 11 Jönköping, Sweden, and Swedish Entrepreneurship Forum, Grevgatan 34, SE-114 53, Stockholm, Sweden
Email: Emma.Lappi@ju.se

1. INTRODUCTION

Crises are the ultimate test of the capabilities and future prospects for new ventures as well as incumbents. A crisis may occur for several reasons: natural catastrophes, terrorism, pandemics or macroeconomic shocks, all being exogenous to the firm. At the firm level, a crisis implies that resources are mobilized to mitigate whatever adverse effects that follow in order to get back to normal, or at least survive. The objective of this paper is to analyze and empirically investigate how previous entrepreneurial experience among new firms' and incumbents' employees influence their crisis resilience.

Resilience among entrepreneurs and SMEs is an issue that has increasingly been addressed among entrepreneurship scholars in the last decades (Doern et al., 2019). As pointed out by Korber and McNaughton Rod (2018), our knowledge regarding the determinants of resilience among entrepreneurs is scarce and there is "…little research on how crises affect entrepreneurship." (Doern, 2016, p.278). There is also a lack of quantitative studies, particularly longitudinal, as emphasized by for instance Davidsson and Gordon (2016). They do however constitute an exception to that rule, presenting a quantitative analysis of nascent entrepreneurs and the global financial crisis 2008/09.[1] Also, Doern et al. (2019) stress the importance of more research on how entrepreneurs learn from crises, and the lack of longitudinal research approaches.

To analyze the impact of entrepreneurial experience on crisis resilience we implement data for the Swedish private sector firms covering the years 1997 to 2016, meaning that we cover two large macroeconomic crises; the IT-crisis 2001-2003 and the Great Recession (GR) 2008-2009. The IT- crisis started in the fourth quarter of 2000 and was characterized by stock markets plunging, decreased investments, higher unemployment, and

[1] There are a few other longitudinal analyses; Ayala and Manzano (2014), Bullough et al. (2014) and Laskovaia et al. (2019).

a decline in new entrants which led to a downturn in economic activity that lasted until 2003 (Andersson & Ådahl, 2005). The pattern during the sub-prime crisis, or the great recession, was different. In 2008 Sweden experienced a 5-percent decrease in GDP but recovered relatively fast from the recession during 2009 (Berg et al., 2018). The two crises were similar in the sense that both were global crises that originated in the US but the respective cause differed; excessive valuation of certain sectors during the IT-crisis while the Great Recession emanated in excessive lending backed by dubious financial instruments as collateral. The latter crisis was also more economy wide. The question we pose concerns which factors could explain how firms managed to cope with the recessions. More precisely, what role does previous entrepreneurial experience among new firms and incumbents play in explaining survival and performance?

Branicki et al. (2018) argue that smaller firms are disproportionately vulnerable to crises. The reason is claimed to be a limited internal resources base in young and small firms, reducing their ability to cope with crises (Herbane, 2010; Smallbone et al., 2012; Storey, 1994). Yet, previous studies also reveal that a fraction of firms identify new opportunities, survive, and even grow during crises. Such resilience has been demonstrated as young and small firms have been exposed to exogenous shocks such as earthquakes (Battisti & Deakins, 2012) or a terrorist attack (Graham, 2007). Branicki et al. (2018) argue that we need to understand these differences in resilience across SMEs and particularly "…. the role of entrepreneurs in that processes" (p.1245). Ayala and Manzano (2014) argue that self-efficacy, adaptability, opportunity recognition, and alike features normally associated with entrepreneurs, also tend to foster resilience. Hence, firms that are more entrepreneurially oriented also demonstrate higher levels of resilience during crises.

Our objective is to empirically investigate how entrepreneurial human capital (EHC) among firms' employees influenced firm performance during the IT-crisis 2001-2003 and the Great Recession 2008-2009. Access to unique Swedish data from 1997 to 2016 enable

us to construct measures on each firm's EHC defined as employees having previous experience of entrepreneurship and for how long they were engaged in entrepreneurial endeavors. Implementing our EHC-measure we estimate the effect on primarily survival using several regression techniques, but also other performance variables will be included in the analysis. We distinguish between new firms and incumbents. In addition, we will take into account previous entrepreneurs' occupational position within the current firm, their level of education, length of entrepreneurial experience, and reason for exiting their previous entrepreneurial engagement. Concordantly we control for other firm level variables typically implemented in survival analyses such as human capital, diversity, previous performance, internationalization, and industry. Hence, we can isolate the effect of previous entrepreneurial experience among employees and relate that to firms' resilience during a crisis. Disentangling employees' human capital on entrepreneurial skills contributes to our understanding of the determinants of entrepreneurial resilience and the firm's resource base.

We contribute with several new insights as regard the importance of EHC for firms to survive crises. First, we find significant differences between new ventures and incumbents where survival of the former is shown to be positively impacted by access to EHC during both crises. For incumbents the positive effect is limited to the IT-crisis and considerably weaker. These results are robust for different estimation techniques, alternative definitions of EHC and performance measures. Second, as we distribute EHC on employees depending on their functional level (managers or non-managers) and level of education, the results are basically unchanged, suggesting that it is the previous entrepreneurial experience as such that is important for crisis resilience in primarily new ventures. Third, we provide evidence showing that having EHC benefits survival, but it may come at a cost of decreased likelihood of a successful exit. This corroborates with previous findings that entrepreneurs cling on too long to their firm before exiting (Shepherd et al., 2009)

Hence, our results advance our understanding of the relationship between crises, resilience, and entrepreneurship. Evidence is provided on a detailed level allowing us to identify the specific contribution of having been involved in entrepreneurship, the length of entrepreneurial experience, and the significance of occupational position and level of education. Theoretically, we believe that the empirical findings will contribute to current theoretical constructs, such as the resource-based view of the firm which will be the framework for our analysis, by enabling further de-bundling of firms' resources. The practical implications of the expected findings are quite straight-forward, i.e., what type of firms (new or incumbent) are likely to benefit from employees with EHC and which previous entrepreneurial experience and individual characteristics exert the strongest impact on firms' crises resilience. These insights should be useful for policymakers as well as practitioners.

The rest of the paper is organized as follows. Section 2 discusses the theoretical and empirical background. Section 3 describes and presents our data and the empirical model we use. Section 4 presents the results and Section 5 concludes.

2. BACKGROUND

2.1. DEFINITION AND THEORETICAL BACKGROUND

The concepts of crisis and resilience have been used in a multifold of ways. As regards crisis we adhere to the definition suggested by Pearson and Clair (1998) p. 66), i.e. "…a low probability, high-impact situation that is perceived by critical stakeholders to threaten the viability of the organization". Hence, for our purposes, the definition emphasizing an external, unexpected, and extensive exogenous shock is more suitable than definitions focusing on internal and gradually evolving crises (REF).

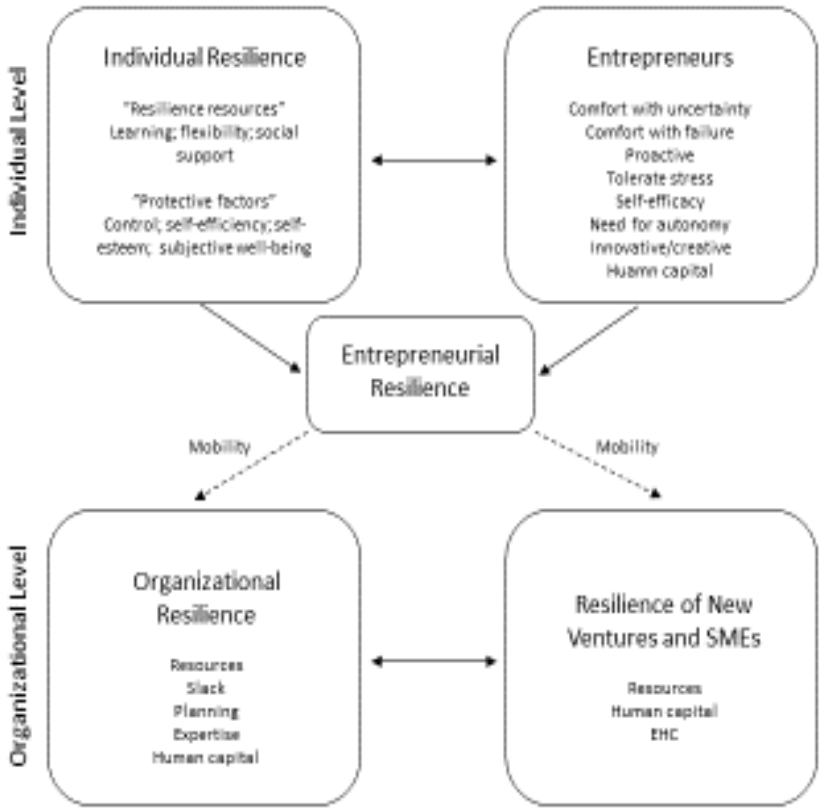
The resilience concept has also been applied in numerous ways. We define it as an organization's ability to maintain functions, identify opportunities and build up and utilize resources during and after crises, thereby responding to sudden adversities (Doern et

al., 2019; Williams et al., 2017). This relates to Bernard and Barbosa (2016) definition which is however more straightforward and emphasizes the ability to "bounce back", but also the bricolage ability, i.e. to utilize the resources at hand at a given point in time and find a solution (Mallak, 1998).[2]

A way of conceptually structuring the previous contribution to the intersection of resilience, entrepreneurship, and firms, and map it to the question we address, is presented in Figure 1. The different boxes have been subject to both theoretical and empirical research, yet there are gaps in understanding the connection between them. The horizontal relationship between the individual level boxes as well as the organizational level boxes seems quite straight-forward. The question we address refers to the vertical connection (dashed arrows) between entrepreneurial resilience and organizational/SME/new venture resilience. We hypothesize that entrepreneurial resilience is transferred through the mobility of former entrepreneurs from the upper part of the figure to the lower boxes, thereby upgrading and augmenting the resource base of new firms and incumbents. According to social cognitive theory, such interaction between different factors serves to determine individuals' abilities (Bandura, 1986), i.e. emphasizing connectivity and mobility between the boxes.

[2] Other definitions classify resilience as engineering, ecological or adaptive (Sabatino, 2016), where adaptive is closest to definitions used here. Tedeschi and Calhoun (2004) have a more prosaic definitions, arguing that it should be based on the ability to go on with life after hardship. Note that crisis management is not synonymous with resilience (Moore, 1983).

Figure 2. Conceptual Framework of Research on Resilience/Entrepreneurship



Note: Modified from Branicki et al. (2018)

Theoretically, we adopt an eclectic approach, embarking from the resource-based view of the firm (Penrose, 1959; Barney, 1991). A firm's resource base can be defined as a bundle of differentiated knowledge and competencies of its employees, together with specific, firm-level, attributes. Minniti and Bygrave (2001) claim that failure is frequently related to a weak resource base and insufficient experience, where entrepreneurs with more experience stand a better chance for success (Shepherd, 2003).

Learning capacities, i.e. acquiring and retaining core competencies (Hamel & Välikangas, 2003) to broaden the opportunity space, is one crucial ability. Hence, individuals' motivation to adapt, upgrade, and improve their skills influences their organizations as

suggested by the conservation of resource theories (Pereira et al., 2020). More generally, organizational resilience, being associated with the capability to harness the experience and identify opportunities, i.e., learning, obviously contributes to strengthening the resource base of the firm. These are also characteristics associated with entrepreneurs and are likely to foster resilience and may generate organizational path-dependencies (Ambulkar et al., 2015; Bonanno et al., 2015).

Thus, even though theoretical constructs stress the importance of individual capabilities, learning, and human capital resources to foster resilience, less effort is devoted to how such abilities are transferred between and within firms. We claim that the mobility of EHC, in particular, is essential to attain higher levels of resilience in young and small firms.

2.2. EMPIRICAL FINDINGS

When an economy is exposed to an exogenous shock, like a pandemic or a financial crisis, investments tend to slow down in the private sector, access to early-stage venture capital diminishes, market demand evaporates and exit rates increases (Bartik et al., 2020; Howell et al., 2020). This effect of business cycle variations in entry and exit of firms is well-established (Campbell, 1998; Bilbiie et al., 2012;Koellinger & Thurik, 2012).Yet, there is also entry of firms during a recession, and breakthrough innovations have frequently been initiated during crises (Braunerhjelm, 2020). Even signs of increased entrepreneurial activity during crises have been reported (Paulson & Townsend, 2005). Brünjes and Diez (2013) claim that a crisis provides the impetus to identify and develop new opportunities (Linnenluecke 2017; Doern et al., 2019), as during the COVID-19 pandemic. Moreover, activities vary depending on the stage of the entrepreneurial life cycle (Bosma and Levie 2010; Davidsson and Gordon, 2016).

Resilience to cope with crises consequently varies among entrepreneurs and firms. Some will exit, others will subside but remain while some even grow. The question is what determines such resilience? An interesting finding is provided by Pereira et al. (2020), where

a strong positive correlation between increased performance and higher shares of entrepreneurs is established at the regional level. Hence, EHC seems to be one conceivable explanation of resilience.[3]

The relatively few empirical analyses of entrepreneurship and resilience have focused on external major shocks such as natural disasters, foot and mouth disease, riots but also wars (Irvine & Anderson Alistair, 2004; Bullough et al., 2014; Cowling et al, 2014; Williams & Vorley, 2014; Williams & Shepherd, 2016; Monllor & Murphy Patrick, 2017; Korber & McNaughton Rod, 2018; Martinelli et al., 2018). There are also a few studies on how small firms and entrepreneurs managed the financial crisis 2008-2009, looking at primarily organizational responses (Doern, 2014). Smallbone et al. (2013), using interviews and surveys, concluded that resilience is influenced by management behavior prior to the crises, combined with an underlying resilience that stems from resources and experience. Davidsson and Gordon (2016), using Australian data, found that nascent entrepreneurs were basically unaffected during the Great Recession, i.e., business as usual.

Other studies have addressed organization resilience, finding a strong link between certain types of human capital and organizational resilience (Malik et al., 2018). As argued by e.g. Elliott and Smith (2006), studying the soccer industry, a key ingredient in building resilience is organizational learning. Bjuggren (2015) presents evidence that ownership structures influence the ability to cope with shocks, where family firms are more resilient, while, Laskovaia et al. (2019), based on Russian micro data, suggest that entrepreneurially oriented SMEs are more crisis resilient. According to Grube and Storr (2018), studying the

[3] There is a large literature within the psychology field addressing the issue of resilience, emphasizing the ability of organizations and individuals to handle uncertainty and having the capacity to bounce back from adversity (Carmeli & Markman, 2011; Linnenluecke, 2017; Pereira et al., 2020; Shepherd et al., 2009) Often it is referred to as a combination of trait, process, and capacity, emphasizing the individual level. See Doern (2016) for a more general account of psychological factors. Shepherd (2003) focusses on grief.

community level, being more entrepreneurially dense implies that the negative effects of a crisis are reduced through a more adaptive handling of crisis-related problems.

To sum up, there is a small but emerging empirical literature on the relationship between entrepreneurship and crises addressing new ventures resilience related to swings in the business cycle, more catastrophic events, and the life-cycle stage of entrepreneurial activity. Similarly, there is a literature more oriented towards incumbents looking at management practices, organizational learning, and internal resources. Finally, there's a psychological trait stressing certain characteristics as being particularly important to handle crises situations, often coinciding with those attributed entrepreneurs.

Overall, these findings suggest that entrepreneurial abilities and experiences may be an important factor for firms to mitigate crises. Yet, there is no systematic analysis of how EHC among employees influences crises resilience among either new ventures or incumbents. Hence, we test the hypothesis that firms – new and incumbents - endowed with EHC are more resilient to severe crises.

3. DATA AND EMPIRICAL STRATEGY

We use register-based matched employer-employee data for Sweden provided by Statistics Sweden (SCB) spanning across the years 1997 to 2016. We use the population of privately owned single-establishment firms active in the manufacturing and service sectors. Firms are allowed to enter and exit the market freely which means we have a large unbalanced panel spanning 19 years and comprising two severe crises; the IT-crisis 2001-2003 and the GR-crisis 2008-2009.

We expect differences to prevail between new ventures and incumbents, since the former are smaller and more resource restricted than incumbents, making them more vulnerable to exogenous shocks (Esteve-Pérez & Mañez-Castillejo, 2008). We, therefore, divide the firms based on their age at time *t*. Firms in their four first years after market entry

are defined as new ventures while firms aged 5 years or older are classified as incumbents. Hence, the age of new firms stretches between the first year of registration up to four years.[4] As a robustness test, we also evaluate the cutoff point of the new ventures around this age which does not significantly change our results.

Firm performance can be defined in various ways, for example in terms firm survival, Tobin's q, or outcomes measures such as employment, sales, productivity, or profits, either in terms of levels or growth rates e.g. (Wernerfelt & Montgomery, 1988)[5]. We are primarily interested in the survival of firms, i.e. the ultimate firm performance indicator, based on the fact that when firms exit, their routines, and resources are extinguished or dispersed, indicating substantial failure of the organization (Mitchell & Singh, 1993). Exits appear when a firm is no longer registered in the dataset. We also have information on exit reasons which are broadly categorized as mergers, acquisitions, and other types of exits. This means we can be sure the firm has exited the market or exist in another form (or if we are missing information).

Following previous literature, we include a set of control variables that explain the survival or exit of firms (Audretsch & Mahmood, 1995; Manjón-Antolín & Arauzo-Carod, 2008; Stearns et al., 1995). First, we include the natural logarithms of the stocks of capital (*LnK*) and labor (*lnL*), to account for the capital levels and size of the firm. To control for the financial performance of the firm, we add the natural logarithm of net sales of the firm (*LnSales*). The sales and the capital variables are calculated in 2016 constant prices in Swedish Krona and labor is defined as the total number of employees. We also include the age of the firm (*Firm Age*), and exposure to international disturbances a dummy variable indicates whether firms import or export intermediate or final products (*Import/Export*). Likewise, we include a dummy variable to capture the largest markets which takes on value one if the firm

[4] The five-year cut-off is frequently used to categorize new firms, see e.g., OECD (2015).
[5] Appropriate measures on firm performance have been widely discussed in the management literature (Richard et al., 2009; Miller et al., 2012). Survival is an absolute measure of at least some success.

is located in one of the three metropolitan areas, i.e., the Stockholm, Malmö, or Gothenburg (*Metropolitan*). To control for the labor turnover and employee experience in the firm we include variables that capture the share of new employees (*Share of New Hires)* and the share of employees that left the firm (*Share Leavers)* both measured between time *t* and *t-1*. Since human capital is argued to be important for firm performance, we include the *Share of Highly Educated Employees* defined as the share of employees with 3 or more years of tertiary education, the *Share of Male Employees* defined as the share of employees who are male, and the *Share of Foreign-Born Employees* based on employees born outside of Sweden, among the control variables.[6]

Our main explanatory variable refers to the human capital of employees acquired through previous experience in entrepreneurship. Entrepreneurial human capital (*EHC*) is derived from individuals' occupational status since 1993. An individual is defined as an entrepreneur if they have owned an incorporated business. We then aggregate the number of employees who previously have been entrepreneurs for each firm, using the shares of employees as an explanatory variable in the estimations of firm-level performance.

There might be sorting of employees with previous entrepreneurial experience to specific types of firms. For instance, entrepreneurs may be more attracted by new or younger ventures. Also, employees formerly engaged in entrepreneurship might differ concerning other observable individual characteristics as compared to employees without such experience. To highlight such possible differences across employees with and without EHC, we provide individual employee-level descriptive statistics in Table 1. We present the information using mean values of the variables and differentiating also based on whether the individual is employed in a new venture or an incumbent firm.

[6] The correlation matrix of the independent variables is provided in Appendix Table A1.

Table 1.
Individual -Level Descriptive Statistics for Employees with and without EHC in New venture or Incumbent Firm

VARIABLES	New Ventures		Incumbents	
	Employee with EHC	Employee without EHC	Employee with EHC	Employee without EHC
Individual Characteristics				
Income (in SEK)	287,662	254,830	331,039	302,901
Age	44.70	35.43	47.99	40.04
Male	0.708	0.598	0.704	0.677
Foreign born	0.171	0.171	0.090	0.113
Years of Schooling	11.79	11.85	11.67	11.64
Years of Employment Experience	9.716	9.592	10.85	11.98
Years of Unemployment Experience	0.854	0.808	0.488	0.506
Years of Entrepreneurship Experience	3.808	0	4.318	0
Characteristics of firms where the Individual is Employed				
Exit (1=Exits t+1, 0 otherwise)	0.264	0.285	0.052	0.044
Sales (in SEK)	4.209e+07	9.749e+07	1.121e+08	2.934e+08
Value Added per Labor (in SEK)	479,798	479,768	617,121	635,631
Share of Former Entrepreneur Employees (EHC)	0.129	0.032	0.150	0.035
Capital (in SEK)	3.373e+07	8.179e+07	5.929e+07	1.682e+08
Labor (number of employees)	24.65	49.69	49.78	119.4
Share of Highly Educated Employees	0.129	0.120	0.116	0.106
Share of Male Employees	0.604	0.565	0.635	0.641
Share of Foreign-Born Employees	0.160	0.158	0.096	0.106
Firm Age (in years)	1.452	1.421	14.01	14.45
Import/Export	0.214	0.233	0.364	0.452
Metropolitan	0.602	0.595	0.515	0.470
Share of New Hires	0.168	0.167	0.169	0.164
Share of Leavers	0.123	0.127	0.144	0.148
Number of Individual-year Observations	836,038	76,897,388	1,110,471	11,445,929

Notes: Income includes labor income in 2016 prices. Years of employment, unemployment, and entrepreneurship experience are calculated from 1993 onwards. The firm variables are described in the text. Mean values of variables are presented in the table.

In both new ventures and incumbent firms, employees who have been entrepreneurs in the past are on average older and earn slightly more than the average employee but have a similar level of education. The representative employee with entrepreneurial experience has spent almost four years in entrepreneurship. There is some sorting of former entrepreneurs to mainly smaller firms. Otherwise, there is no evidence of sorting based on the productivity of the firm or other firm characteristics. There are some observable individual-level differences amongst

the employees with and without entrepreneurial experience but most importantly, there is some sorting into firms which for our empirical estimations would end up with a negative bias in our estimations which means it is likely that our estimations for EHC are underestimated.

As previously stated, we are interested in the relationship between the survival of firms and the level of EHC the firms have. Our firm-level empirical estimations are as follows:

$$Exit_{it+1} = \beta_0 + \varphi_1 EHC_{it} + \varphi_2(IT_{it} * EHC_{it}) + \varphi_3(GR_{it} * EHC_{it}) + \beta \boldsymbol{X} + \gamma_k + \gamma_t + \varepsilon_{it} \qquad (1)$$

where the subscript *i* refers to the firm and *t* to the year. Our dependent variable is $Exit_{it+1}$, which is a dummy variable that takes on value 1 if the firm exits the market in the next period. This means we calculate exit probabilities. IT_{it} is a dichotomous variable taking on values 1 for the IT-crisis years 2001 to 2003 and zero otherwise, and, similarly, GR_{it} takes value 1 for the Great Recession years 2008 to 2009, and zero otherwise. Furthermore, the φ_1 term captures the impact of having EHC and the exit probabilities in non-crisis periods whereas the interpretation of the estimated φ_2 and φ_3 coefficients are the impact of EHC on the outcome variable during the two crisis periods. $\boldsymbol{X}$ is a vector of control variables explained above. We also control for industry *k* and year *t* effects. ε_{it} is the conventional error term. [7]

In our baseline results, we estimate equations 1 through a linear probability model. However, as our dependent variable is dichotomous, we also implement a logit estimation (following Audretsch et al., 2000). Finally, since our key variable is survival, we implement a cox-proportional hazard model (Cox, 1972) where we model the survival time and the probability that a firm exits the market at time *t* conditional on having survived up to that point. This survival model is widely used in the previous literature (Audretsch & Mahmood,

[7] Our identification relies on the ability to control for a large set of observable firm characteristics and that the industry (γ_k) and year (γ_t) fixed effects purge out any variations due to time and industry specific shocks that might arise. The results are robust to including industry-year fixed effects which controls for the year specific industry shocks.

1995; Agarwal & Audretsch, 2001). Hence, three different estimation methods are applied, and we run the regressions separately for new ventures and incumbent firms.[8] The estimated coefficients in all three models can be interpreted as the impact (or the relationship) of a particular covariate to the likelihood or probability of exit.

Table 2 below describes our sample and the variables we use in our firm-level estimations as defined in equation 1. We show the average values of the variables for new ventures and incumbent firm respectively. A table with a full set of descriptive statistics can be found in the appendix (Table A2).

Table 2.
Estimation Descriptive Statistics, Firm Level

VARIABLES	New Ventures	Incumbents
Exit	0.237	0.062
Sales (in 1000 SEK)	1.189e+07	2.372e+07
Labor Productivity (in SEK)	464,388	545,100
Share of Former Entrepreneur Employees (EHC)	0.051	0.065
Capital (in 1000 SEK)	1.124e+07	1.394e+07
Labor (number of employees)	7.305	10.64
Share of Highly Educated Employees	0.089	0.067
Share of Male Employees	0.482	0.476
Share of Foreign-Born Employees	0.134	0.0705
Firm Age (in years)	1.522	12.52
Import/Export	0.139	0.201
Metropolitan	0.553	0.479
Share New Hires	0.163	0.143
Share Separations	0.122	0.128
Number of firm-year observations	1,188,033	1,310,102
Number of firms	547,947	224,272

Notes: Shares of employees are calculated in relation to the total number of employees (Labor)

There are some notable differences across the firm characteristics for new ventures and incumbents. As expected, new ventures exit more often, fair worse in financial performance and are smaller in size. An average new venture has 5.1-percent of its employees with entrepreneurial background whereas incumbents have 6.5-percent which means an average

[8] See Manjón-Antolín and Arauzo-Carod (2008) for a review on empirical estimations on firm survival. Note that the cox-proportional hazard models are truncated as we divide our sample based on firm age. This is the main reason why we do not rely on these estimates for our main estimation models.

incumbent firm has slightly more EHC than a new venture. Note also that we have approximately twice as many new ventures in our dataset (548,000) as compared to incumbent firms (224,000), whereas the total number of firm-year observations is nearly the same. This mirrors the fact that many firms exit within the first years after entry, i.e., we have a longer panel for incumbent firms on average in our sample.

4. RESULTS

4.1. Main Results

We estimate equation 1 through Ordinary Least Squares (OLS), logistic regressions (Logit), and the semi-parametric Cox-proportional Hazard (Cox-Hazard) techniques and the results are presented in Table 3[9]. We report the marginal effects for the logit estimations and Cox-Hazard functions.

Table 3.
Main Results

Dependent Variable:	New Ventures			Incumbents		
Exit	OLS	Logit	Cox-Hazard	OLS	Logit	Cox-Hazard
	(1)	(2)	(3)	(4)	(5)	(6)
EHC	-0.037***	-0.234***	-0.117***	0.003**	0.073**	0.150***
	(0.003)	(0.022)	(0.016)	(0.002)	(0.029)	(0.031)
IT-Crisis						
EHC	-0.057***	-0.445***	-0.198***	-0.009**	-0.136*	-0.055
	(0.007)	(0.057)	(0.039)	(0.004)	(0.072)	(0.071)
Great Recession						
EHC	-0.019***	-0.110**	0.036	0.012***	0.211***	0.307***
	(0.007)	(0.046)	(0.030)	(0.004)	(0.058)	(0.062)
LnSales	-0.019***	-0.110***	-0.023***	-0.008***	-0.130***	-0.089***
	(0.000)	(0.003)	(0.002)	(0.000)	(0.006)	(0.008)
LnK	0.000**	0.002	0.012***	-0.001***	-0.012***	-0.012***
	(0.000)	(0.001)	(0.001)	(0.000)	(0.002)	(0.003)
LnL	0.062***	0.346***	0.245***	0.000	0.033***	0.111***
	(0.001)	(0.004)	(0.003)	(0.000)	(0.008)	(0.009)
Share Higher Educated	0.005**	0.068***	0.046***	0.014***	0.218***	0.180***
	(0.002)	(0.014)	(0.009)	(0.002)	(0.025)	(0.027)
Share Male	0.073***	0.468***	0.306***	0.028***	0.482***	0.478***
	(0.001)	(0.008)	(0.005)	(0.001)	(0.015)	(0.017)
Share Foreign Born	0.043***	0.215***	0.102***	0.019***	0.224***	0.275***
	(0.002)	(0.010)	(0.006)	(0.002)	(0.023)	(0.026)
Firm Age	-0.062***	-0.432***	-1.053***	-0.002***	-0.038***	-0.086***

[9] As a robustness test, we also implement a probit estimation for our baseline model (see A3 in appendix).

	(0.000)	(0.002)	(0.009)	(0.000)	(0.001)	(0.001)
Import/Export	-0.014***	-0.083***	-0.057***	-0.002**	-0.050***	-0.057***
	(0.001)	(0.008)	(0.005)	(0.001)	(0.012)	(0.014)
Metropolitan	0.019***	0.108***	0.033***	0.000	0.002	-0.022***
	(0.001)	(0.005)	(0.003)	(0.000)	(0.008)	(0.009)
Share New hires	0.014***	0.335***	0.102***	0.085***	1.256***	0.168***
	(0.002)	(0.012)	(0.011)	(0.001)	(0.020)	(0.021)
Share Leavers	0.032***	0.268***	0.123***	0.084***	0.978***	0.318***
	(0.002)	(0.010)	(0.013)	(0.002)	(0.016)	(0.026)
Constant	0.476***	0.126***		0.175***	-0.765***	
	(0.008)	(0.046)		(0.005)	(0.086)	
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Observations	1,188,034	1,188,033	866,864	1,310,102	1,310,090	1,050,768
Firms	547,947	547,947	483,987	224,272	224,272	184,307
R2	0.096			0.024		

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. A negative coefficient implies a decrease of the probability of firm failure

The results show that in general the probability of exits decreases for new ventures having more EHC. This is in line with the Resource-Based View of firms' capabilities, i.e., internal resources that explain why firms make different strategic choices that lead to different outcomes. We find that one such internal resource is having employees with EHC, i.e., it is not only the size but also the type of resources that is important for survival.

Notably this is only the case for new ventures whereas in more established firms there is a small but increasing effect of EHC and the probability of exiting. Hence, for new and smaller ventures, having employees with entrepreneurial competence seem to contribute better strategies and improved resilience. In established firms, likely to be characterized by a different management and organizational structures, employees with EHC seems to increase the likelihood of exiting. Our results only allow us to speculate on the reasons for the different outcome, conceivable explanations may be more routinized decision structures, different company cultures, or some kind of quality sorting or miss-match of competencies in incumbents.

The results also show that during the IT-crisis EHC decreased the exit probabilities for both types, albeit the effect was much weaker for incumbents. During the Great Recession

only new ventures benefited from access to EHC. These results suggest that entrepreneurial competence is especially important for new ventures where the challenges are different compared to already established incumbents. In addition, the effects of EHC seems crisis-specific to some extent, where the technologically induced IT-crisis differs from the GR. In the former EHC had a more pervasive positive effect whereas in the latter the positive effects were confined to new ventures.

4.2. Heterogeneity in the Years

We have found a general positive relationship between EHC and lower exit rates during a period of almost two decades, including two major macroeconomic crises, particularly for new ventures. As an alternative measure we continue by presenting results for each respective year, based on equation 2:

$$Exit_{it+1} = \beta_0 + \partial_t(t * EHC_{it}) + \beta \boldsymbol{X} + \gamma_k + \gamma_t + \varepsilon_{it} \qquad (2)$$

The ∂_t coefficients are the yearly (t) variations of the Entrepreneurial Human Capital (EHC_{it}) coefficients, while all the other variables are unchanged from equation 1. The point estimates of the EHC coefficients, i.e., the ∂_t terms are derived from a linear probability model and presented in Figures 1A and 1B with 95-percent confidence intervals.

Figure 1A. Exit New Ventures

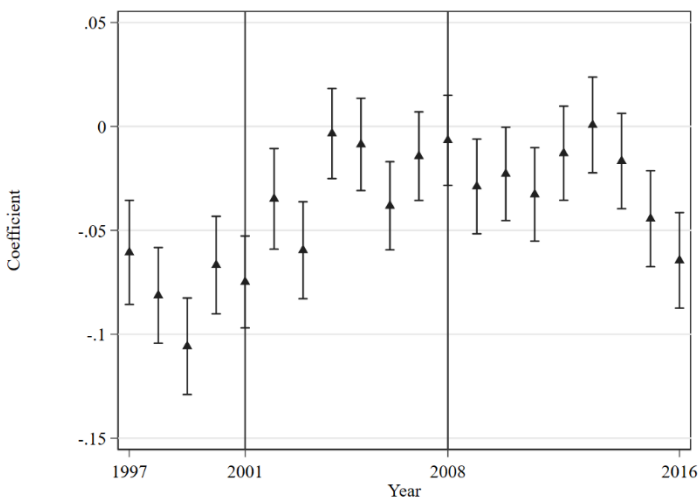
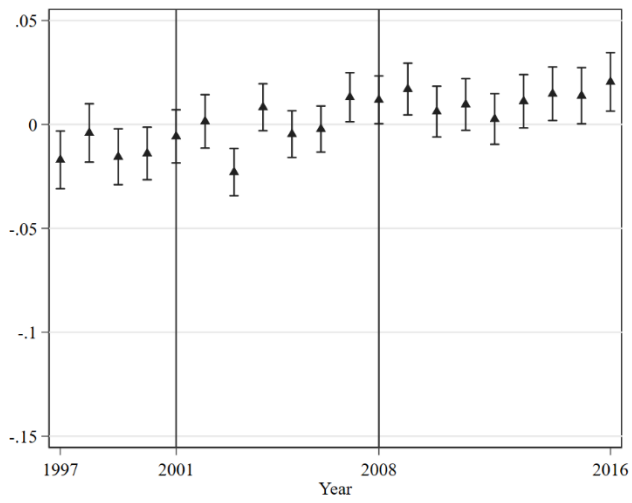


Figure 1B. Exit Incumbents



Note: A negative coefficient implies a decrease of the probability of firm failure

During the IT-crisis especially new ventures with more EHC are again shown to be less likely to fail as well as the proceeding two years after the Great Recession. In 2000, when the "new economy" hype culminated which later on was followed by a burst of the IT-bubble, the positive effect of EHC in reducing exits diminished somewhat as compared to 1998-1999. As the difficulties became more pronounced in the subsequent years 2001-2003 access to EHC was important for survival. When markets became more stable the impact of the EHC variable was less evident but increased during the GR-crisis 2008-2009.

As can be seen in Figure 2B, there is little evidence of a relationship between the exit of incumbents and EHC during the IT-crisis period, except for a significant but small impact of 2003, and even a small increase in exit probabilities during and after the GR-crisis. Hence, the results reveal a divergent impact of EHC on firm survival based on the age of the firm where new ventures are found to benefit from having former entrepreneurs as employees, especially during crisis periods. In general, the results are in line with the baselines estimations when we look at yearly variations. We therefore conclude that EHC is particularly

important for survival of new ventures, both in crisis and non-crisis times, and may depending on the type of crisis also reduce hazard rates among incumbents.

5. MECHANISMS

5.1. Length of the Entrepreneurial Experience

So far, we have implemented a measure of the EHC-variable based on the share of former entrepreneurs among employees. This measure however does not account for the length of the experience and individuals with longer experience may have gained more entrepreneurial human capital. Those with longer experience in entrepreneurship may thus have superior entrepreneurial skills and knowledge (Minniti & Bygrave, 2001; Parker, 2013). This indicates that it may be more important to have experienced former entrepreneurs in the firm rather than a large share with relatively few years of experience.

Due to the longitudinal nature of our data, we can measure the years of entrepreneurial experience for individuals going back to 1993. We then aggregate the years to the firm-level and construct a measure that accounts for the amount of EHC-year for each firm. We have two alternative EHC measures, one expressed as in total entrepreneurial years and the other as total entrepreneurial years divided by the total number of former entrepreneurs (both in natural logarithms). The first measure estimates the overall amount of EHC defined as the aggregate previous entrepreneurial experience (years) while the other takes the average length of the individual EHC experience into account. This allows us to separate between the effects coming from a large number of years irrespective of how these are distributed among former entrepreneurs and entrepreneurs who have been active for many years. The results for the two alternative measures are presented in Table 4.

Table 4.
Results from Different EHC Measure

	New Ventures		Incumbents	
Dependent Variable: Exit	(1)	(2)	(3)	(3)
EHC	-0.019***	-0.017***	-0.001***	-0.001***
	(0.001)	(0.001)	(0.000)	(0.000)
IT-Crisis				
EHC	-0.028***	-0.029***	-0.003***	-0.003***
	(0.001)	(0.002)	(0.001)	(0.001)
Great Recession				
EHC	-0.019***	-0.018***	-0.001**	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Control Variables	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	1,188,034	1,188,034	1,310,102	1,310,102
Firms	547,947	547,947	224,272	224,272
R2	0.096	0.096	0.024	0.024

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All estimations include industry-year and year fixed effects. In columns 1 and 3, EHC is measured as natural logarithm of total entrepreneurial years and in columns 2 and 4, entrepreneur years per former entrepreneur. Estimation method is the linear probability model.

The results for new ventures again show a positive effect of employees having more entrepreneurial years and survival. Now, even the incumbent firms experience a decline in exit probabilities, albeit smaller, when having more EHC. The difference between the two estimates of EHC is negligible, where the results from having a large number of employees with entrepreneurial background (columns 1 and 3) are basically unchanged as we implement entrepreneurial years per previous entrepreneur. However, we now find evidence that even for incumbent firms EHC has a negative impact on the likelihood of exit, i.e. as the length of its entrepreneurial experiences in terms of year that matte rather than having many former entrepreneurs per se.

5.2. Alternative Performance Measures: Productivity

Survival of firms is closely related to other measures of performance and in this section, we relate EHC to some alternative firm level outcomes, i.e., sales and productivity (Stigler, 1958;

Klepper, 2002). This means that we can present indicative evidence of whether the positive relationship between EHC is influenced by higher firm performance.

We estimate a similar model as in equation 1 with the natural logarithm of labor productivity (value-added per employee) of the firm as our dependent variable.[10] Value added per employee is denoted in Swedish Krona and deflated to 2016 prices. Similar to before, we estimate the models separately for the new ventures and incumbent firms. The results are presented in Table 5.

Table 5.
Results from Productivity

	New Ventures	Incumbents
Dependent Variable:	Ln(Productivity)	Ln(Productivity)
	(2)	(2)
EHC	0.105***	0.035***
	(0.006)	(0.004)
IT-Crisis		
EHC	0.072***	0.072***
	(0.014)	(0.009)
Great Recession		
EHC	0.108***	0.039***
	(0.013)	(0.009)
Control Variables	YES	YES
Industry FE	YES	YES
Year FE	YES	YES
Observations	1,155,908	1,299,336
Firms	533,067	222,635
R2	0.239	0.326

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The results indicate that for both firm types having EHC increases thr productivity of firms. This suggests that EHC is a way for firms to gain internal resources and capabilities to adapt to the changing environment and improve their performance in general but also during crises, The relationship with EHC and performance slightly decreases during the IT crisis, but only for the new ventures. Note that our baseline results (Table 3) showed small but increasing probabilities of EHC and exits of incumbent firms. Hence, even if having EHC enhances the

[10] We exclude the sales from the explanatory variables.

productivity of incumbents, this does not transcend to survival, whereas the opposite is found for new ventures.

5.3. Employee Skills and Survival

In the previous estimations, we measured the EHC for all types of labor within a firm irrespective of their skills and educational level. Yet managers are likely to have a more direct impact on the strategies chosen by firms than non-managers. Similarly, more highly educated individuals are likely to be more productive and better at absorbing new knowledge (Becker, 1962). Hence, entrepreneurial competence might be tied to their position within a firm or their education levels. We therefore estimate EHC possessed by high- and low skilled employees, defined either through their occupational status or educational attainment.

The individual data include information on both the occupation and the educational attainment of individuals. The occupational codes follow the international ISCO-08 codes, for which we have information since 2001. High skilled occupations are defined in the 1-digit level as operations managers, occupations requiring an advanced level of higher education, and occupations requiring higher education qualifications or their equivalent. The remaining functions are bundled into a group called non-managers, composed of employees involved in administration and customer services, other services and shop sales, building and transport workers, and other, more elementary functions. Based on education we categorize individuals as high skilled if they have three or more years of tertiary education. The low skilled employees are individual with lesser years of education.

We measure the previous entrepreneurial experience emanating from these groups of employees and construct the EHC variable separately for the high- and low-skilled. Results are shown in Table 6.

Table 6.
Occupation, Education and Exit Probabilities

Dependent Variable:	New Ventures		Incumbents	
Exit	Managers	Education	Managers	Education
	(1)	(2)	(3)	(4)
$EHC_{High-Skilled}$	-0.029***	-0.049***	0.011**	-0.005
	(0.008)	(0.008)	(0.005)	(0.005)
$EHC_{Low-Skilled}$	-0.058***	-0.035***	-0.002	-0.044***
	(0.004)	(0.003)	(0.002)	(0.009)
IT-Crisis				
$EHC_{High-Skilled}$	-0.051***	-0.048**	0.004	-0.003
	(0.015)	(0.019)	(0.009)	(0.009)
$EHC_{Low-Skilled}$	-0.071***	-0.058***	-0.015***	0.005**
	(0.008)	(0.007)	(0.004)	(0.002)
Great Recession				
$EHC_{High-Skilled}$	-0.011	-0.054***	0.022**	-0.004
	(0.015)	(0.015)	(0.009)	(0.004)
$EHC_{Low-Skilled}$	-0.027***	-0.013*	0.008**	0.014***
	(0.008)	(0.007)	(0.004)	(0.004)
Control Variables	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	1,188,034	1,188,034	1,310,102	1,310,102
Firms	547,947	547,947	224,272	224,272
R2	0.096	0.096	0.024	0.024

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All estimations include same control variables as before. Estimation method is the linear probability model.

The new ventures significantly benefit from EHC emanating from all of the skill levels no matter how defined. Some variation can be observed across the crises periods but the difference between the skill levels is most of the time statistically insignificant. However, for incumbent firms the results vary considerably with no clear support for higher skills leading to higher survival rates. The reason may be idiosyncratic factors not captured by the regressions.

5.4. Successful Exit or Firm Closure?

Firms can exit the market through various channels, for example, bankruptcy, mergers or acquisitions. In our baseline estimations, our dependent variable is defined as taking on value 1 if the firm exists the next period. However, we can classify the exits based on two broad categories; a merger or acquisition which we define as a successful exit, or through other ways

which contains closure due to bankruptcies, low profitability, etc. The latter type of closures are considered failures. We then re-run the regressions of equation 1 where the dependent variable is classified according to exit mode. Results are reported in Table 7.

Table 7.
Results for Different Exits

	New Ventures		Incumbents	
Dependent Variable:	Closures (1)	Mergers & Acquisitions (2)	Closures (3)	Mergers & Acquisitions (4)
EHC	-0.021***	-0.015***	0.011***	-0.008***
	(0.003)	(0.002)	(0.001)	(0.001)
IT-Crisis				
EHC	-0.040***	-0.017***	0.000	-0.009***
	(0.006)	(0.004)	(0.003)	(0.002)
Great Recession				
EHC	-0.009	-0.011**	0.018***	-0.006***
	(0.006)	(0.004)	(0.003)	(0.002)
Control Variables	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	1,188,034	1,188,034	1,310,102	1,310,102
Firms	547,947	547,947	224,272	224,272
R2	0.061	0.054	0.023	0.015

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All estimations include the same control variables as before. All estimations include same control variables as before. Estimation method is the linear probability model.

The results show that for new ventures, having EHC decreases the likelihood of exiting irrespective of the definition of our dependent variable. Hence, there seems to be valuable experiences for new ventures from employees that were entrepreneurs in the past. However, for the incumbent firms, EHC of their employees matter for the two types of exits. Having higher shares of EHC increases the likelihood of closures but decreases the likelihood of mergers and acquisitions. The latter effect is however small. The results, therefore, indicate that even though having employees with former entrepreneurial background is beneficial for survival, particularly for new ventures, it is no guarantee for successful exits.

6. DISCUSSION AND CONCLUSION

By using detailed longitudinal data covering the population of private sector non-agricultural firms, our results show that having former entrepreneurs as employees increase firm performance both in crisis and non-crisis times and that this positive relationship differs between new ventures and incumbent firms. Having entrepreneurial competence within a firm is especially important for new ventures. Our results show also that the increase in firm performance is associated with having more entrepreneurially experienced employees which implies that entrepreneurial experience is a potential way to gain human capital for individuals which the firms can then benefit.

Understanding what kind of human capital matters for firm performance under crisis situations brings about managerial implications. When managers in new firms made hiring decisions, they should evaluate the previous experience of the potential employees bearing in mind that entrepreneurial experience might be beneficial to their firm's performance both in good macroeconomic environments but also especially during difficult times.

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