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## Entrepreneurship as a Career

An investigation into the pre-entrepreneurship antecedents and post-entrepreneurship outcomes among the Science and Technology Labor Force (STLF) in Sweden

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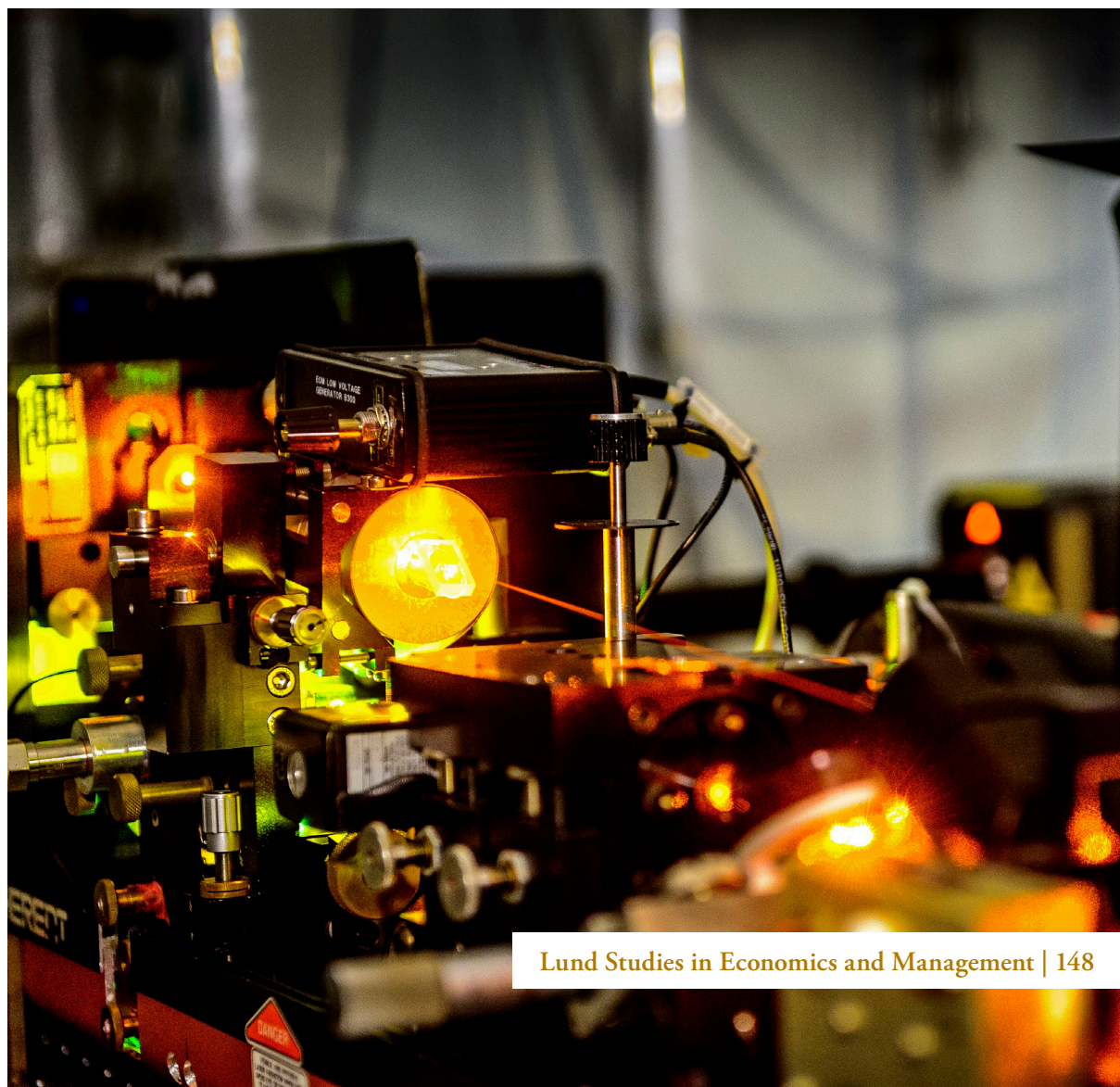
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VIVEK KUMAR SUNDRIYAL | DEPARTMENT OF BUSINESS ADMINISTRATION





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Vivek Kumar Sundriyal



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DOCTORAL DISSERTATION

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Abstract This dissertation provides a career perspective on entrepreneurship based on the research question: "How do organizational bureaucracy and relative income affect the career choice of entrepreneurship among employees from the science and technology labor force (STLF); and what are the career outcomes in terms of returns during, and post entrepreneurship on re-entry into paid employment?" More specifically, the dissertation investigates (1) how mobility into entrepreneurship versus switching jobs is influenced by the level of bureaucracy in the organization and individual's relative income compared to similar individuals and (2) how labor market returns after a period in entrepreneurship are influenced by the duration and number of prior spells in entrepreneurship, as well as the level of bureaucracy in the employer organization prior to and after entrepreneurship. Based on a matched employer-employee dataset (1990-2008) provided by Statistics Sweden, the results suggest that organizational bureaucracy and income inequality markedly influence an employee's career choice of entrepreneurship versus a job switch, as well the initial income and entry size in entrepreneurship. Additionally, the results indicate that the returns from entrepreneurship on re-entry into paid employment differ based on the number of years in entrepreneurship, number of spells in entrepreneurship, the employer bureaucracy prior to entry into entrepreneurship, and employer bureaucracy on re-entry into paid employment. The dissertation contributes to the research on entrepreneurial careers, entrepreneurial entry, and the returns from entrepreneurship.			
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**MADE IN SWEDEN** 

*Wholeheartedly, to my late mum and dad*

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# 1. Introduction

On a dark winter evening, Jenny, a qualified computer scientist, gazes through the window while sipping her evening coffee. Jenny ponders about her career journey thus far

Jenny began her career in paid employment as a software programmer with a large corporation. She worked hard and rose up the corporate ladder. However, she realized that it was time to “move on”. Jenny also compared her salary to others with similar qualifications. Jenny now had a choice to either grow within the company, to switch jobs or opt for a career in entrepreneurship. Jenny eventually decided to take the plunge into entrepreneurship. However, entrepreneurship was not an easy journey and cost Jenny time, money and effort. Jenny worked and toiled on the laborious path of entrepreneurship. However, after the entrepreneurial journey, Jenny decided to move back into paid employment. Jenny compared herself to Annie, who never experienced entrepreneurship and remained in paid employment throughout her career

Sipping her coffee, Jenny now wonders – why a career in entrepreneurship? Was it really worth it?

## Principal Topic

The organizational context of employers has a major influence on the career paths of employees and their potential decision to venture into entrepreneurship (Audia & Rider, 2006; Sørensen & Fassiotto, 2011) as well as their entrepreneurial outcomes (e.g. Dencker & Gruber, 2015). However, much current research not only focuses on a career in entrepreneurship as an isolated phenomenon emphasizing either entrepreneurial entry (e.g. Sørensen, 2007; Sørensen & Sharkey, 2014) or entrepreneurial outcome (e.g. Luzzi & Sasson, 2016) but is also based on large swaths of the labor market. Venturing into entrepreneurship is rarely an end in itself, as movements from paid employment into entrepreneurship and back into paid employment are remarkably common (Burton, Sørensen, & Dobrev, 2016; Carroll & Mosakowski, 1987). In order to understand entrepreneurship as a career, it is important to consider both the career choice of entrepreneurship and outcome of the decision, not only during the entrepreneurship career but also post entrepreneurial



career. Although scholars have investigated mobility across occupational status (e.g. Sørensen & Sharkey, 2014) and such mobility remains common in modern economies, we still have limited understanding of the precise mechanisms that drive mobility into entrepreneurship and the same time understand the outcomes.

My dissertation zooms in on the careers of highly-skilled employees from the Science and Technology Labor Force (STLF)<sup>1</sup> in their decision to venture into entrepreneurship versus a job switch and at the same time examines the career outcome not only during entrepreneurship but also post entrepreneurship by encompassing early performance in entrepreneurship and on re-entry into paid employment. It connects the pre-entrepreneurship antecedents and post-entrepreneurship consequences of a career in entrepreneurship. Additionally, a focus on a well-defined STLF population provides a homogenous sample with less unobserved heterogeneity and also overcomes limitations posed by studies that investigate highly generic samples that are likely to overstate the economic importance of small proprietorships such as caterers and barbershops (Elfenbein, Hamilton, & Zenger, 2010: 660).

Broadly, my dissertation approaches the investigation using research on the sociology of entrepreneurship by considering the antecedents and the consequences of a career in entrepreneurship among the STLF in Sweden. Although I also borrow from entrepreneurship related literature in other disciplines such as economics, organization and management, the core elements of the dissertation (e.g. careers, bureaucracy, and inequality) stem primarily from sociology. More specifically, this dissertation comprises four studies that investigate the mechanisms of bureaucracy and income inequality as the antecedents of entrepreneurial entry and the consequences of a career in entrepreneurship by examining the returns from entrepreneurship post re-entry into paid employment. This study is important because a career perspective that takes into consideration both the antecedents and the consequences of a career in entrepreneurship provides a comprehensive view of entrepreneurship as a career among the science and technology workforce, an important labor force in entrepreneurship research (Braguinsky, Klepper, & Ohyama, 2012; Delmar, Wennberg, & Hellerstedt, 2011; Sauermann, 2018).

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<sup>1</sup> The labour force educated in Science, Technology, Engineering and Mathematics (STEM). In this dissertation, STLF refers to the labour force, while STEM refers to the educational qualification of the labour force.

# Organizations, Careers, & Mobility

Individuals spend most of their time working in organizations and an organization's practice and structures shape their experiences. As life goes on, individuals advance in their careers by either by moving up the career ladder within the organization or by looking for advancement opportunities outside the organization – either into entrepreneurship or a job switch. Organizations also develop the knowledge and skills of employees that can be transferred to entrepreneurship, thereby influencing their returns from entrepreneurship, and as we will see later in this dissertation, how entrepreneurship experience influences the careers of those who re-enter paid employment after being self-employed.

Established organizations are seen as venues where careers<sup>2</sup> of individuals take off, and most entrepreneurs have careers in established organizations prior to venturing into entrepreneurship. Using publicly available data from Silicon valley startups, Burton et al. showed that 93% of entrepreneurs were employed in firms before venturing into entrepreneurship (Burton, Sørensen, & Beckman, 2002; Sørensen & Fassiottto, 2011). Organizations not only play an important role in career mobility within and between organizations, but also into entrepreneurship (Bidwell & Mollick, 2015; Rider, Thompson, Kacperczyk, & Tåg, 2019; Sørensen & Sharkey, 2014).

## Entrepreneurial Entry as a Career Choice

Movements between paid employment and entrepreneurship are common and have generated scholarly interest in which the curiosity of organizations and entrepreneurship scholars converges (Audia & Rider, 2006; Sørensen, 2007; Sørensen & Fassiottto, 2011; Sørensen & Sharkey, 2014). Scholars have investigated various reasons that lead individuals to leave wage employment and venture into entrepreneurship. Research seeks to understand the nature of organizational career paths and its influence on an employee's decision to venture into entrepreneurship (e.g. Carroll & Mosakowski, 1987; Sørensen & Sharkey, 2014). Although entrepreneurship research suggests that individuals enter entrepreneurship due to various reasons such as the need for achievement (McClelland, 1961), tolerance of risk (Cramer, Hartog, Jonker, & Van Praag, 2002), and the need for autonomy (Benz, 2009), research at the intersection of organizations and entrepreneurship largely emphasizes how the organizational context influences entry into entrepreneurship. For example, Sørensen and Sharkey (2014) investigated why employees move into self-employment by seeking an explanation rooted in a

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<sup>2</sup> A formal definition of career is presented in chapter 2

sociological understanding of the mobility process. More specifically, the study investigates how organizational characteristics, namely the arrival of advancement opportunities within the organization, affect the likelihood of an employee venturing into entrepreneurship. Entrepreneurship is seen as a preferred choice for career advancement over other choices such as remaining in the same organization or moving to a different organization. The study by Sørensen and Sharkey does not focus on how people's preference for certain types of work drives the choice between alternative employment and entrepreneurship, but rather on how the presence or absence of advancement opportunities in wage labor affects the likelihood of venturing into entrepreneurship.

Audia and Rider (2006) suggest that although there is a large volume of empirical studies that support the notion of entrepreneurs as organizational products, knowledge of the precise mechanisms that help explain this relationship is still limited and often indirect. This indicates that previous research studying the drivers for employees to engage in entrepreneurship provides broad explanations of how organizations influence the career mobility of employees into entrepreneurship and generally examines entrepreneurial entry as a special case of labor market movement. The broad explanation limits our knowledge to a superficial understanding that fails to deepen our insights, while treating entrepreneurship as a special case on the labor market that does not provide an understanding of the relative appeal of entrepreneurship versus alternative labor market options such as a job switch. Career mobility (Rider et al., 2019) research suggests that employees are likely to evaluate entrepreneurial options not only relative to being employed in the incumbent firm but also relative to a job switch.

Additionally, previous studies were based on large swaths of the labor market by either focusing on the generic population or on a specific industry. For example, Sørensen's study (2007: 390-391) based on Danish data and the general population suggests different mechanisms of bureaucracy (e.g. hindering entrepreneurial skills through role specialization, desirable employment options in bureaucracies compared to smaller firms) for mobility into entrepreneurship. In another study, Andersson Joona and Wadensjö (2013) provide empirical explanations for individuals to engage in entrepreneurship based on a sample of Swedish male employees. Focusing on a particular industry, Kacperczyk (2012) uses data from the US mutual fund industry to investigate the role of opportunity structures in large and matured firms on influencing an employee's decision to venture into entrepreneurship.

Research suggests that investigating broad samples is likely to lead to undesirable unobserved heterogeneity by including individuals with varying individual characteristics such as educational background, social status or gender. Generic samples are likely to include a variety of individuals with limited education such as barbers or caterers and more highly educated individuals such as tech entrepreneurs in the same sample, leading to an average effect of the entire sample and not

capturing the effects of a particular sub-group of the labor market (Elfenbein et al., 2010). Unobserved heterogeneity is a serious concern in entrepreneurship research that could provide estimates with lower precision (Davidsson, 2009). Additionally, focusing on a specific industry may or may not generalize the findings to other industries (Elfenbein et al., 2010).

In summary, existing research in entrepreneurship has advanced our knowledge on how organizations play an important role in shaping future entrepreneurs. However, a significant number of studies provide only coarse grained explanations of what influences the career mobility of employees into entrepreneurship. There exists a significant gap in terms of studies that provide a fine grained understanding of the mechanisms that influence specific sub-groups of the labor market that could minimize the problems posed by generic samples.

## Dealing with Heterogeneity

While developing advanced knowledge on how organizational context affects an employee's propensity to venture into entrepreneurship, previous entrepreneurship studies (e.g. Sørensen, 2007; Tåg et al., 2016) assume homogeneity in the labor market and make conclusions based on a generic labor force that is heterogeneous in nature. Heterogeneity can occur at various levels such as industry, firm, and individual level. At the firm level, spurious effects of workplace characteristics might influence entrepreneurial entry if an individual self-selects to work in firms that are entrepreneurial in nature. At the individual level, people with varying education levels are likely to differ in terms of cognitive and analytical abilities, leading to unobserved heterogeneity in the underlying sample, which is a serious concern in entrepreneurship research. Unobserved heterogeneity can involve cognitive abilities, traits such as levels of risk-aversion or personality features that are stable over time and that can affect the results (Davidsson, 2009).

Davidsson (2009) suggests that one of the ways to reduce heterogeneity is to focus on narrow samples that can provide strong results that test a relationship. He states that "Recent examples show that theory-driven research on narrow samples can lead to strong results regarding relationships that have appeared weak or inconsistent in previous research" (Davidsson, 2009: 110). Furthermore, Andersson & Wadensjö suggest that focusing on a homogenous sample can also prevent some of the selection problems associated with entry into entrepreneurship (Andersson Joona & Wadensjö, 2013).

In addition to the heterogeneity at sample level, previous studies introduce heterogeneity by using mere self-employment as a proxy for entrepreneurship, essentially not splitting different types of self-employment. Levine and Rubinstein (2017: 964) state that "Michael Bloomberg and a hot dog vendor" should not be

mixed and disaggregate self-employment into incorporated and unincorporated entrepreneurship to differentiate between “entrepreneurs” and other business owners.

In summary, heterogeneity can occur not only by including a broad sample with varying individual characteristics such as cognitive and analytical abilities, but also by mixing the various definitions of self-employment, which are likely to induce spurious effects in the relationship to be examined, thereby calling for a focus on a narrow sample and a narrow definition of entrepreneurship.

## STLF & Incorporated Entrepreneurship

We noted above that unobserved heterogeneity is a serious concern in entrepreneurship research that can be minimized by using a narrowed sample that is homogenous in nature. Such a sample is likely to reduce the problems associated with heterogeneous samples that include large swaths of the labor market. At the individual level, homogeneity in the sample can be made possible by focusing on, for example individuals with similar educational levels.

Human capital explanations (Becker, 1964) suggest that individuals with similar educational levels are likely to have similar initial earnings at the start of their careers (Albrecht, Bronson, Thoursie, & Vroman, 2018), similar career paths, and similar levels of career success (Cox & Harquail, 1991). In the social sciences and in entrepreneurship research, a population that has received significant attention is the STLF – individuals educated in science, technology, engineering, and mathematics<sup>3</sup>. In short, entrepreneurship research suggests that this part of the labor force is endowed with high human and social capital and known for entrepreneurship with a significant economic impact (Delmar et al., 2011).

Elfenbein et al. (2010) focus on scientists and engineers when examining the small firm effect in entrepreneurship. They posit that the STLF is the target of policy makers and associated with entrepreneurship as an engine of economic growth. In another study, Eberhart, Eesley, and Eisenhardt (2017) portray the STLF as elite individuals with strong human and social capital who create high growth firms. Furthermore, Delmar et al. (2011) and Delmar, Wennberg, Wiklund, and Sjöberg (2005) focused on the STLF in the Swedish labor market and investigated important research questions in entrepreneurship research. More specifically, Delmar et al.

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<sup>3</sup> Section 2.7.2 of this dissertation provides further explanation of the importance of this labor force in entrepreneurship.



(2011) argue that the STLF is very important because they are most likely to identify entrepreneurial opportunities and are highly skilled<sup>4</sup>.

Additionally, research in entrepreneurship (e.g. Henrekson & Sanandaji, 2014; Levine & Rubinstein, 2017) broadly differentiates entrepreneurship into unincorporated and incorporated entrepreneurship and suggests that not separating the two could lead to misleading inferences about entrepreneurship. As incorporated entrepreneurship warrants strong non-routine cognitive skills such as creativity and analytical thinking and is also likely to require more educated individuals (Levine & Rubinstein, 2017), entrepreneurs from the STLF are likely to be associated more with incorporated entrepreneurship than unincorporated entrepreneurship.

## Bureaucracy, STLF and Entrepreneurship

In general, large bureaucratic firms pay higher wages than small firms, provide career advancement opportunities, and employ highly qualified labor (Cobb & Lin, 2017; Even & Macpherson, 2012; Kalleberg & Van Buren, 1996; Leontaridi, 1998). With increasing returns to education (Mouw & Kalleberg, 2010), the higher pay in general and career advancement opportunities make them attractive employers, especially for highly educated individuals such as those from the STLF. Despite recent changes in modern management such as flatter structures or reduced hierarchies, bureaucracy is still prevalent and it is estimated that it will take about half a century to witness the end of bureaucracy (Adler, 2012; Alvesson & Thompson, 2004; Burtch, Carnahan, & Greenwood, 2018). This indicates that it is still relevant to study bureaucracy in modern management, which continues to rely on bureaucratic practices such as career advancement linked to promotion and salary increases (Arnold & Cohen, 2013). As the organizational sociologist Max Weber argued: “once fully established, bureaucracy is among those social structures which are the hardest to destroy” (Weber, 1922: 328).

The concept of a career is typically linked to bureaucracies that flourished in the 20<sup>th</sup> century. The typical metaphors were ladders and treetops where success was based on hierarchical advancement with ever increasing enumeration (Arnold & Cohen, 2013; Moore, Gunz, & Hall, 2007). Bureaucracies<sup>5</sup> exemplify pyramid shaped organizations with a typical career ladder, where career advancement narrows as one moves up the ladder (Blau, 1968). Such bureaucratic organizations are known to push out entrepreneurs by not funding their ideas (Gompers, Lerner,

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<sup>4</sup> In section 3.5 I provide a descriptive analysis to highlight how the STLF differs from non-STLF, at least in Sweden

<sup>5</sup> A formal definition for bureaucracy is provided in chapter 2

& Scharfstein, 2003) and also produce entrepreneurs of higher quality than smaller ones (Hvide, 2009). Bureaucracies are also part of the same population of organizations and therefore define the labor market for employees.

Besides the fact that careers become typically associated with bureaucratic organizations, they are also an important part of the Swedish labor market. Sweden is a typical welfare state and coordinated market economy (CME) with the labor market broadly divided into large dominant employers and smaller firms (Henrekson & Roine, 2005). In addition to the importance of bureaucracies in the context of the Swedish labor market, sociological theory suggests that bureaucracies are hierarchical with several management layers where the mobility of a career is increasingly limited as highly skilled employees move up the ladder, which means that they have to accept their position or move out (Baron & Bielby, 1980b). Merton (1940:562) also suggested that bureaucracies with their rigidly defined roles and emphasis on rules and routines “exert a constant pressure upon the official to be methodical, prudent, disciplined” and “unusual degree of conformity with prescribed patterns of action”, thereby making highly skilled workers inflexible in their work activities. Schumpeter suggested that a bureaucratic work environment exerts a “depressing influence on the most active minds” (cf Sørensen, 2007:390). With bureaucratic organizations having narrowing growth opportunities with increasing hierarchies, only the most highly skilled will be able to move up, while the less skilled either remain in their current position or move out to an alternative position such as entrepreneurship or a job switch as a means of career advancement.

Bureaucratic organizations in general pay higher wages than smaller firms. Sociology research has examined how the wage setting system in organizations influences larger societal income inequality (Cobb, 2016). Research has focused on the role of large firms affecting the distribution of wages by paying workers more on average than smaller firms (e.g. Cobb & Lin, 2017; Hedström, 1991). In general, research indicates that large firms contribute to the growing income inequality (Cobb & Lin, 2017). Additionally, research suggests that more educated individuals are likely to have a higher variation in their wages relative to those who are less educated. An increase in education levels across the labor force is likely to increase wage inequality (Lemieux, 2006).

In sum, bureaucracies form an important part of the labor market that offers career opportunities, especially for those with a higher education such as scientists and engineers, as such organizations are likely to offer career advancement opportunities and also provide higher remuneration that is a potential driver of increasing income inequality.

# Income Inequality, Relative Income and Entrepreneurship

Income inequality refers to the distribution of income across members of a collective such as an organization and can be derived from sources such as wages (Cobb, 2016). It can be described by the means of the Gini coefficient or an individual's relative position in the income distribution (Donovan, 2015; Payne, Brown-Iannuzzi, & Hannay, 2017). An individual's relative income – income more or less than that of others (Cheung & Lucas, 2016) influences outcomes such as life satisfaction and happiness. This suggests that individuals care about their *relative* position in society (e.g. Cheung & Lucas, 2016; Clark, Frijters, & Shields, 2008; Tsui, 2014). More specifically, how well an individual feels about how she/he is doing in society is more influenced by her/his relative standing than by the absolute income (Frank, 1985). Theory suggests that an individual's outcome based on the relative position in the income distribution is likely to be driven by social comparison. For example, Payne et al. (2017) posit that through the process of social comparison people judge their own standing relative to others and that satisfaction with their income influences their attitude to risk taking and the job quit rates.

In entrepreneurship research, this understanding has encouraged scholars to examine how relative income influences a propensity towards entrepreneurship (e.g. Andersson Joona & Wadensjö, 2013; Nikolaev & Wood, 2018). For example, using a nationally representative sample of the U.S. General Social Survey, Nikolaev & Wood investigated how an individuals' relative position in the income distribution moderates the relationship between the proportion of entrepreneurs in a regional cohort, individual attitude, and the likelihood of choosing self-employment. They suggest that through the process of social comparison, people at the lower end of the income distribution are more likely to develop positive attitudes towards self-employment, while those at the upper end are more likely to choose self-employment.

In summary, research suggests that organizational bureaucracy and relative income affects employee propensity to venture into entrepreneurship. However, current research only provides broad explanations of this relationship based on generic samples. Additionally, entry into entrepreneurship is examined as an isolated event, largely ignoring the understanding that employees are likely to evaluate mobility into entrepreneurship relative to other options such as a job switch.

## Career Outcome & Returns from entrepreneurship

In terms of entrepreneurship as a career, entrepreneurial entry can be viewed as a step along the career trajectory that helps us to understand entrepreneurial activity shaped by career experience but also career experiences shaped by entrepreneurial activity (Burton et al., 2016). A significant share of entrepreneurs re-enter paid employment after an experience in entrepreneurship (Kaiser & Malchow-Møller, 2011). Viewing entrepreneurial entry as a step along the career trajectory helps us to not only understand the precursors to entry but also the outcome beyond entry – namely the returns from entrepreneurship on re-entry into paid employment. Therefore, tying entrepreneurial entry with the outcome of entrepreneurship provides a coherent understanding of the entrepreneurial career.

The last few decades have witnessed a substantial rise in self-employment. Policy makers throughout the world pursue policies to promote self-employment. Many public policies are designed for individuals to become entrepreneurs in various ways. For example, in Sweden after 2006, the tax on capital income from unlisted shares was reduced to 20 from the previous 30%. In the US, policies have largely favored entrepreneurs relative to wage earners (Acs, Åstebro, Audretsch, & Robinson, 2016; Blanchflower, 2000). Intuitively, individuals are likely to take advantage of the favorable policies towards entrepreneurship and a significant share of entrepreneurs were previously wage employees. Using data from Silicon Valley in the United States, Burton et al. (2002) suggest that 93% of the entrepreneurs were wage earners prior to venturing into entrepreneurship.

Motivated by the interest of policy makers as well as individuals who pursue self-employment in their career, there has been a growing interest in examining the returns from entrepreneurship, not only during entrepreneurship but also on entry into paid employment post entrepreneurship (e.g. Bruce & Schuetze, 2004; Campbell, 2013; Daly, 2015; Evans & Leighton, 1989; Failla, Melillo, & Reichstein, 2017; Hamilton, 2000; Kaiser & Malchow-Møller, 2011; Luzzi & Sasson, 2016; Van Praag & Raknerud, 2017). Research on entrepreneurship provides an understanding of the associated rewards during entrepreneurship such as initial income and entry size (e.g. Agarwal & Audretsch, 2001; Andersson Joona & Wadensjö, 2013; Elfenbein et al., 2010) and comparing the income of entrepreneurs to the wages of employees in paid employment (e.g. Hamilton, 2000; Hartog, Van Praag, & Van Der Sluis, 2010). Although this research adds to our understanding of the returns from entrepreneurship, it provides an incomplete view of the rewards associated with entrepreneurship by assuming that an entrepreneurial career is an end in itself and largely ignoring the fact that movements into and out of entrepreneurship are fairly common. Studies, largely based on broad samples, indicate that a significant share of entrepreneurs move into wage employment after experiencing entrepreneurship. For example, Kaiser and Malchow-Møller (2011)

study on Danish men suggests that 50.8% of the self-employed return to paid employment after 5 years in entrepreneurship.

Although there is a growing interest in examining the returns from entrepreneurship for entrepreneurs who enter wage employment after experiencing entrepreneurship, the results have been rather mixed. In general, studies base their findings on a comparison of the wages of entrepreneurs relative to those of employees with similar observational characteristics in paid employment. For example, when comparing ex-entrepreneurs with employees switching jobs, Luzzi and Sasson (2016) suggest that on average ex-entrepreneurs earn 19% more than employees who did not experience entrepreneurship, while, Kaiser and Malchow-Møller (2011) claim that a spell in self-employment leads to lower hourly wages relative to employees who do not experience entrepreneurship. The mixed results indicate that we are still uncertain about whether or not entrepreneurship pays and hence the topic warrants further examination.

### **Duration, Bureaucracy, and Returns from entrepreneurship**

Entrepreneurship is not an easy journey as it is associated with elements such as risk (Koudstaal, Sloof, & Van Praag, 2015) and the liability of newness (Freeman, Carroll, & Hannan, 1983; Stinchcombe, 1965; Yang & Aldrich, 2017). It can also be viewed as a journey (McMullen & Dimov, 2013) that needs time to develop and master the skills associated with entrepreneurship. The initial skills of entrepreneurs are likely to differ from skills at a later stage of entrepreneurship (Yang & Aldrich, 2017), thus human capital is influenced by the entrepreneurial experience. However, moving in and moving out of entrepreneurship is also likely to depreciate the human capital from entrepreneurship (Parker, 2013). An entrepreneur's human capital from entrepreneurship experience is likely to differ based on the time and number of spells spent in entrepreneurship. On re-entry into paid employment, the returns from entrepreneurship are likely to differ based on the number of years and number of spells spent in entrepreneurship.

In general, research that investigates returns from entrepreneurship mainly employs human capital theory (Becker, 1964) as the main theoretical foundation to examine how an entrepreneur's human capital from entrepreneurial experience is likely to influence subsequent wages in paid employment. However, research suggests that firm characteristics can confound the human capital of the individuals by influencing employee productivity and thereby affecting their wages (Burton, Dahl, & Sorenson, 2017; Elfenbein et al., 2010; Sørensen, 2007).

One important firm characteristic is organizational bureaucracy (Weber, 1924). Firms vary based on factors such as skill requirement, rewards, and complexity. Larger firms have different skill requirement than smaller firms. For example, larger firms are generally more bureaucratic and expect employees to have highly



specialized skills (Kalleberg & Van Buren, 1996), while smaller firms expect employees to have generic skills (Elfenbein et al., 2010). As entrepreneurship is a labor market activity that endows entrepreneurs with more generic than specialized skills (Lazear, 2004), the returns from entrepreneurship are likely to differ based on the match (Sørensen & Kalleberg, 1977) of their skills with the expectations of their employer. Contingent on the bureaucratic nature of the entrepreneur's employer prior to entry into entrepreneurship, entrepreneurs are likely to either appreciate or depreciate their skills (Mincer & Ofek, 1982) gained in previous employment. Similarly, contingent on the bureaucratic nature of the entrepreneur's re-entering employer, entrepreneurs are likely to be more productive in firms that are better matched (Sørensen & Kalleberg, 1977) to their skills gained from entrepreneurship, and less productive in firms that are poorly matched to the skills they gained from entrepreneurship. Therefore, on re-entry into paid employment, wages are likely to be influenced by both the entrepreneur's employer prior to entry into entrepreneurship and the employer at re-entry.

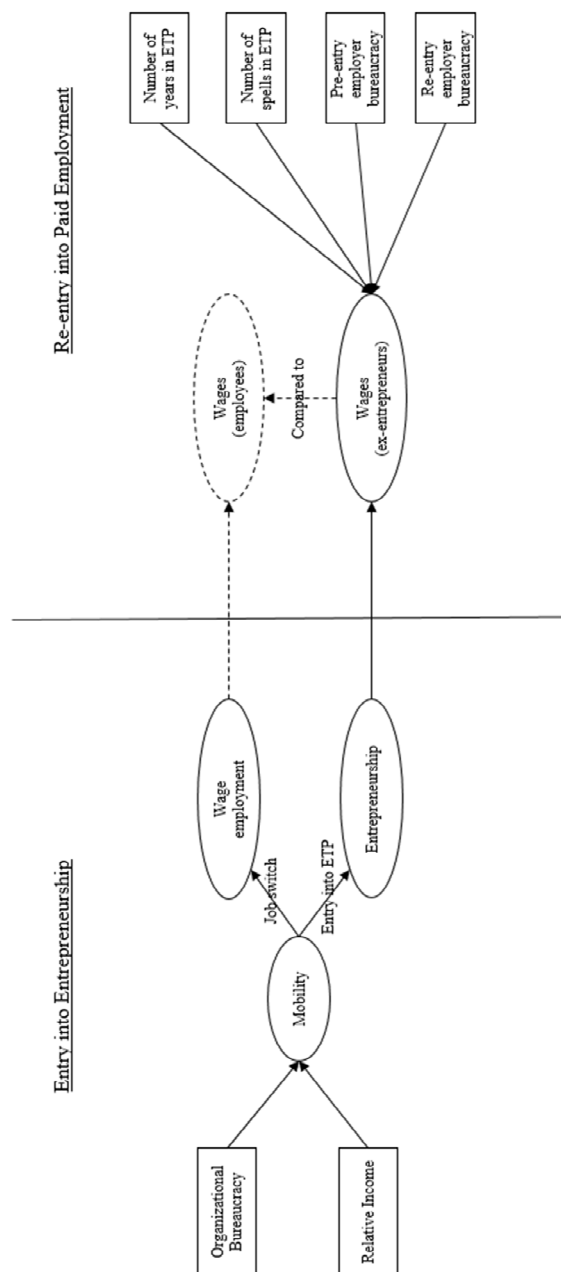
In summary, research on the returns from entrepreneurship, which is mainly based on broad samples, provides mixed results and we still cannot say with certainty whether or not entrepreneurship pays off. Additionally, the literature provides an understanding that returns from entrepreneurship can differ based on factors such as duration, number of spells, and the bureaucratic nature of the entrepreneur's employer prior to entry into entrepreneurship and the bureaucratic nature of the entrepreneur's employer at re-entry.

## A Simple Research Model

Despite the important insights from existing research on entrepreneurial entry and returns from entrepreneurship on re-entry into paid employment, there are significant gaps as discussed above that warrant further examination. Additionally, existing entrepreneurship research examines entrepreneurial entry and returns from entrepreneurship as largely separate entities, thus failing to provide an integrated view of entrepreneurship as a career. There exists a significant gap that provides a comprehensive understanding of an entrepreneurial career that ties together the important aspects of the entrepreneurial process. Understanding entrepreneurship in terms of the antecedents to the career choice of entrepreneurship and its outcome in terms of the returns from entrepreneurship – during and on re-entry into paid employment – is likely to provide a comprehensive view of entrepreneurship as a career.

Figure 1.1 illustrates a research model that provides a comprehensive view of entrepreneurship as a career that encompasses entry into entrepreneurship and re-entry into paid employment after an experience in entrepreneurship. The left side of

the figure - "Entry into Entrepreneurship" – illustrates the influence of the two antecedents of organizational bureaucracy and relative income on mobility into entrepreneurship versus a job switch. Employees have the choice of entering into entrepreneurship or wage employment – some pursue a career in entrepreneurship while others continue their careers in paid employment. The outcome of the decision to venture into entrepreneurship can be evaluated by comparing the wages of ex-entrepreneurs who re-enter paid employment with the wages of employees who remained in paid employment. The right hand side of the figure – "Re-entry into paid employment" – illustrates the returns from entrepreneurship based on the factors of duration, number of spells, the bureaucratic nature of the employer prior to entry into entrepreneurship, and the bureaucratic nature of the employer at re-entry compared to employees who do not experience entrepreneurship.



**Figure 1.1**  
A simple research model

## Problem Statement & Purpose

The nature of organizational career paths influences an employee's propensity to venture into entrepreneurship versus a job switch and the entrepreneurial outcomes. Current research offers broad explanations of the mechanisms that influence entry into entrepreneurship based on the entire labor market. Additionally, research is largely disjointed as it emphasizes either entrepreneurial entry or entrepreneurial outcomes. We still have only limited knowledge of the precise mechanisms that affect the organizational careers of knowledge workers from the STLTF in their propensity to venture into entrepreneurship versus a job switch and the career outcome of the entrepreneurship experience. The research on which this dissertation is based addresses the gap in understanding of the careers of those in the STLTF by covering the entire entrepreneurial process – from entrepreneurial entry to its outcome on re-entry into paid employment.

This research is important for the following reasons. First, a career perspective on entrepreneurship, where transition into entrepreneurship is not seen as a final destination but a step in the career trajectory, is an important and fruitful research area. It provides an understanding of the antecedents and at the same time the outcome of entrepreneurship. A career perspective in entrepreneurship views entrepreneurship as similar to other careers. It permits the integration of theory and methods from other sub-fields into entrepreneurship, thereby providing newer insights into the field. The perspective also enables an understanding of entrepreneurship as a sequence of past states and future trajectories (Burton et al., 2016). Second, highly skilled knowledge workers from the STLTF constitute an important pool of high-potential entrepreneurs. This labor force, which is known to play a key role in industrial growth and technological change (Elfenbein et al., 2010; Hellmann, 2007; Stenard & Sauermann, 2016), possesses high human and social capital, making them attractive to the labor markets. And third, a significant share of the labor market attempts self-employment in their careers and policy makers throughout the world encourage self-employment (Acs et al., 2016). Understanding the consequences of such policies lies in investigating the returns from entrepreneurship.

The purpose of this research is therefore twofold. First, to investigate the careers of employees from the STLTF in Sweden and the contextual factors influencing their propensity to venture into entrepreneurship versus a job switch. And second, to explore the career outcomes of entrepreneurship during and post entrepreneurship on re-entry into paid employment. By understanding the careers of the STLTF, from entrepreneurial entry to re-entry into paid employment, this multifaceted dissertation therefore aims to contribute to the literature on the entrepreneurial careers of knowledge workers, entrepreneurial entry and the returns from entrepreneurship.

## Research Question

The study aims to investigate the antecedents of entrepreneurial careers among the in Sweden and the consequences of entry into entrepreneurship, summarized by the following research question:

How do organizational bureaucracy and relative income affect the career choice of entrepreneurship among employees from the science and technology labor force (STLF); and what are the career outcomes in terms of returns during, and post entrepreneurship on re-entry into paid employment?

## The Four Studies of the Dissertation

This dissertation is broken down into four studies. The first study focuses on organizational bureaucracy as a driver of entrepreneurship versus a job switch for skilled workers from the STLF. More specifically, this study investigates the relative appeal of mobility into entrepreneurship over a job switch by examining two important mechanisms in bureaucracies that influence the decision to venture into entrepreneurship: the formal division of labor leading to the development of specialized skills more suited to the current firm and the increasingly limited career advancement possibilities as employees move up the career ladder. Additionally, this study investigates how the formal division of labor and the availability of career options within the current firm influence early entrepreneurial performance (entry size).

The second study focuses on how an employee's relative income influences mobility into entrepreneurship versus a job switch and how this relationship is moderated by an employee's organizational rank. Additionally, this study investigates how an employee's relative income influences the initial income and entry size in entrepreneurship.

The third and the fourth study investigate the returns from entrepreneurship by examining the wages of entrepreneurs on re-entry into paid employment. The third study investigates how the number of years and the number of spells in entrepreneurship affect the subsequent wages of entrepreneurs on re-entry compared to employees who do not experience entrepreneurship. The fourth study also investigates how the employer bureaucracy prior to entry into entrepreneurship and the bureaucracy of the employer at re-entry affect the subsequent wages of entrepreneurs on re-entry into paid employment compared to employees with no experience of entrepreneurship.

Table 4.1 in chapter 4 provides a short summary of the four studies in this dissertation, thus enabling the reader to obtain an overview of the theoretical perspectives, sample, methods, and main findings of each of the four studies.

## Connections between the Four Studies

The general conceptual model (Figure 1) of an entrepreneurial career is investigated in each of the four studies. Based on the broad research question, the conceptual model is broken down into parts – the career choice of entrepreneurship and the career outcome of this choice. The first part of the research question pertains to the relationship between organizational contextual factors and the career choice of entry into entrepreneurship. The first two studies address this part of the research question by investigating two contextual factors – bureaucracy and income inequality and how each influences mobility into entrepreneurship versus a job switch and the initial performance in entrepreneurship. The second part of the research question pertains the outcome of the choice of entrepreneurship. Study 3 and Study 4 address this part of the research question by investigating the number of years in entrepreneurship, the number of spells in entrepreneurship and employer bureaucracy – not only prior to entry into entrepreneurship but also on re-entry into paid employment – and how each influences the outcome measured by comparing the wages in paid employment to those of employees with no experience of entrepreneurship.

## Structure of the dissertation

This chapter is followed by a literature review where I discuss previous studies and relevant theories used in this dissertation and outline how they relate to the research questions examined in this dissertation. This is followed by a methods chapter where I describe the overall research design and level of analyses of the four studies. The fourth chapter provides extended summaries of all four studies of this dissertation, while the final chapter discusses the results and implications of this dissertation.



## 2. Literature Review

Why be concerned about the influence of bureaucracy and income inequality on mobility into entrepreneurship among the STLF in Sweden and why study the returns from entrepreneurship post re-entry into paid employment? Furthermore, how can this be investigated through a careers perspective on entrepreneurship?

This dissertation investigates entrepreneurship as a career by examining the antecedents to entry into entrepreneurship and the consequences of experience in entrepreneurship. More specifically, it presents four studies that investigate how bureaucracy and income inequality influence the career choice of entrepreneurial entry among the STL and its consequent influence on the outcome by examining the returns from entrepreneurship. To enable better understanding of the research topic, I present some formalized facts about the topics that this research aims to investigate, the current standing of the literature, the gaps, and how this study aims to address those gaps.

This chapter unfolds in the following manner. In the first part, I present a brief introduction to the literature on careers and the literature on entrepreneurship. I then move on to provide the reader with broad overviews on topics around organizations, bureaucracy, income inequality, returns from entrepreneurship, and the STLF. I then present a formal literature review of bureaucracy and entrepreneurship, income inequality and entrepreneurship, and returns from entrepreneurship. The chapter ends with a short conclusion of the literature review and a list of the definitions and concepts used in this dissertation.

### The Literature on Careers: A Brief Introduction

The concept of a career has evoked significant interest in early and contemporary research. Traditionally, careers were characterized as an individual's employment association within the context of one or two firms. The word "career" was usually described in terms of an individual's movement in an organization. The career was "seen as a set of attributes and experiences of an individual who joins, moves through and finally leaves an organization" (Schein, 1971: 401). Career success was measured in terms of salary increases and promotions, and generally defined by the organization, which focused on mobility within the organization (Hall & Las Heras,



2009; Schein, 1971). Promotions and demotions were important events in most people's working lives (Rosenbaum, 1979).

However, changes in the environment such as rapid technological advancement, excessive use of part-time and temporary workers, outsourcing of firm activities, and increased globalization, altered the traditional multi-layered structures of organizations, thereby creating changes in how individuals viewed their career (Sullivan & Baruch, 2009; Sullivan, 1999). In addition to the changing environment, other factors such as changing family structures (e.g. single working parents) brought about changes in how individuals view their career – from a traditional inwardly focused career determined by the employer's training and investment in an employee to a modern career largely determined by the employee and spanning multiple firms and boundaries (Arthur & Rousseau, 2001; Kuijpers & Scheerens, 2006).

Over the past two decades, “new” or “contemporary” career concepts have been introduced in the careers literature that are construed as the opposite of “old”, “traditional” or “organizational” careers. The new or modern career concepts generally assume that individuals are increasingly mobile and self-directed in their career (Gubler, Arnold, & Coombs, 2014; Kuijpers & Scheerens, 2006). The contemporary career concepts that emerged in the 1990s included hybrid careers, the kaleidoscope career model (KCM), the postcorporate career, the boundaryless career concept, and the protean career concept (Sullivan & Baruch, 2009). Although there were a multitude of models that sought to explain contemporary careers, only the protean (Hall, 1996) and boundaryless careers (Arthur & Rousseau, 2001) have become acknowledged career concepts (Akkermans & Kubasch, 2017; B. Arthur, 2014; Gubler et al., 2014).

In short<sup>6</sup>, the protean career concept focuses on the achievement of an individual's subjective career goals to by following a particular career path. It mainly focuses on the psychological success that results from an individual's career management, as opposed to career development by the organization. Individuals with a protean career attitude are “values-driven” (using their own values to drive their career) and “self-directed” (take an independent role in managing their behavior) (Briscoe, Hall, & DeMuth, 2006; Gubler et al., 2014; Hall, 1996).

The boundaryless career refers to the sequence of job opportunities that could go beyond the boundaries of a single employer. The objective of the boundaryless career was to suggest an antonym for a “bounded” or “organizational” career with the theme of independence from, rather than dependence on, a traditional organizational career. Individuals with a boundaryless career attitude are

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<sup>6</sup> A detailed discussion on boundaryless careers and protean careers can be found in Arthur, M.B & Rousseau, D.M. (2001), Arthur, M. B (1994), Arthur M.B (2014), Gubler, M., Arnold, J., & Coombs, C. J. J (2014), and D. Hall (1996).

characterized by physical mobility across organizational boundaries (Arthur, 1994; B. Arthur, 2014).

Sullivan and Baruch (2009) indicate that despite the popularity of new career concepts such as boundaryless and protean careers, scholars must recognize that the traditional career is “still being enacted by some workers and is still more prevalent in some organizations, industries and countries than in others” (p. 1561). Organizational careers in some advanced industrial economies is not only inevitable but also found to be desirable by many people, especially in larger private organizations and the public sector (Clarke, 2013; Renee Barnett & Bradley, 2007; Rodrigues & Guest, 2010). When evaluating modern careers, Hall and Las Heras (2009: 182) stated: “We were wrong on the most important part: the death of the organizational career. Careers in organizations are alive....People, even the so called Millennials, otherwise known as Generation Y, still aspire to join and succeed in well-respected and successful organizations. Also, the organizations *again* are interested in loyal, productive and committed employees”.

Clarke (2013) suggests a “new organizational career” that shifts focus from an internal organizational career to a one that includes both an internal and external focus. In a new organizational career, the expectation is that career advancement will require crossing organizational boundaries. The new organizational career will include elements of the boundaryless career that spans organization and/or occupations (Clarke, 2013). At the same time, scholars have been calling for an interdisciplinary approach that integrates career research with other domains such as entrepreneurship (Akkermans & Kubasch, 2017).

In sum, the concept of a career has shifted from a traditional hierarchy driven one where career success and advancement were limited to promotion through the ranks and salary increase to a contemporary or modern career that spans organizational boundaries. However, a significant number of people still find a traditional hierarchy driven organizational career appealing and relevant in the modern environment. Finding employment in large organizations remains an attractive career option and career advancement can not only take place within the organization but also across organizations into different occupations such as entrepreneurship, thereby calling for interdisciplinary research across domains.

## **A definition of Career**

The concept of a career is shared across various social science disciplines. Although psychological and sociological perspectives dominate, the concept of a career has a diversity of perspectives. The psychological perspective (Holland, 1996) on careers concerns understanding how dispositional differences affect job adoption. The sociological perspective (Glaser, 1968) involves understanding role behavior in an organizational setting, while the economic perspective (Becker, 1964) entails how

human capital accumulates through education and experience. Besides these perspectives, there are also views in disciplines such as political science, anthropology, history and geography or a transdisciplinary, social-psychological view that defines career as an “individually mediated response to outside role messages” or (Arthur, Hall, & Lawrence, 1989: 10).

As a concept that is shared across diverse disciplines such as psychology, sociology, and economics, the definition of a career can either reflect a specific point of perspective – such as the sociological view that sees a career in terms of social roles and status (Stebbins, 1970), or the psychological view that sees a career in terms of individual interest or attitudes (Schein, 1996), or the definition can reflect a broader view of a career that is independent of any particular perspective. Sullivan and Baruch (2009) suggest that in the past, the definitions of careers were generally centered around the employee-employer relationship, while contemporary scholars tend to define careers more broadly, but with no agreement on a common definition.

Based on the review of the literature, I adopt Sullivan & Baruch’s definition of a career as “an individual’s work-related and other relevant experiences, both inside and outside of organizations, that form a unique pattern over the individual’s life span” (Sullivan & Baruch, 2009: 543). This definition is well suited to the present work, because it considers, physical movements, such as across occupations, jobs, employers, and industries, as well as the interpretation of the individual’s perception of career outcomes (e.g. how one defines career success). It also takes into consideration the fact that an individual’s career does not take place in a vacuum but within contexts such as cultures or organizations (Sullivan & Baruch, 2009). In the context of the present research, this definition allows me to capture how work-related experiences, i.e. bureaucracy and income inequality, influence another related experience, i.e. entrepreneurship, and how entrepreneurship impacts on the work-related experience (i.e. returns from entrepreneurship).

## The Literature on Entrepreneurship

The knowledge base of entrepreneurship research mainly originates from three disciplines: psychology, economics, and sociology (Thornton, 1999). Each of these disciplines answers different questions and focuses on different levels of analysis (Martinelli, 1994). As entrepreneurship is a complex and multi-faceted phenomenon, no one discipline or schema can provide a complete understanding of all aspects of entrepreneurship (Reynolds, 1991). Busenitz et al. (2003) argue that focusing on entrepreneurship research at the intersection of constructs of individuals and the environment will enhance the legitimacy of the field.

The psychological studies mainly rooted in the works of McClelland - are based on the psychological traits of individuals such as the need for achievement, leadership,

risk-taking propensity, problem solving style, innovativeness, and values (Thornton, 1999). The economics of entrepreneurship explores how economic incentives affect entrepreneurial behavior and how entrepreneurial behavior affects the economy (Parker, 2009). Foss, Klein, and Bjørnskov (2018) suggest that the field of entrepreneurship emerged from economics (e.g. Baumol, 1990; Schumpeter, 2000), which continues to inform entrepreneurship research. However, they argue that in some approaches employed in economics, entrepreneurship is treated as decontextualized and removed from its macro contexts such as culture and society. Sociology complements economics, anthropology, history, geography, and political science (Reynolds, 1991) and is mainly concerned with the study of the contexts in which entrepreneurship takes place. This perspective addresses the precursors of entrepreneurship with emphasis on who becomes an entrepreneur and why (Ruef & Lounsbury, 2007). The sociological lens of entrepreneurship views entrepreneurship at levels beyond the individual that include the social context of the entrepreneurial activity.

Thornton argues that the field of entrepreneurship should be divided into the supply side and the demand side. While the supply side of entrepreneurship focuses on the individual traits of entrepreneurs, the demand side focuses on the context in which entrepreneurship occurs. The author strongly argues for the contextual analysis of organizational founding, as entrepreneurship is initiated by existing organizations. Although entrepreneurship is indeed started by individuals, as suggested by the supply side perspective, individuals and organizations are heavily influenced by the social context in which they are embedded. Therefore, integrating sociological theories into entrepreneurship research can contribute to a nuanced understanding of entrepreneurship (Thornton, 1999). The sociological view of entrepreneurship helps us to understand the context in which entrepreneurship occurs.

## **Sociology of Entrepreneurship**

The roots of the sociology of entrepreneurship can be traced to Weber's *History of Commercial Partnerships* that studied Roman and Germanic commercial laws and their influence on the commercial partnerships of medieval entrepreneurs. The study suggests that societies differ greatly in the extent of agency granted to entrepreneurs and their organizational ventures. Institutional frameworks generated by the Roman and Germanic laws were seen as influential in the life of the enterprises that evolved from the commercial partnerships (Ruef & Lounsbury, 2007). The study provides an example of how different contexts can have varied influences on the entrepreneurial activity of the partnership enterprises governed by Roman and Germanic laws.

Contemporary sociology of entrepreneurship research has four important perspectives that trace their roots back to Weber's work: (a) the *contextual* perspective emphasizes the role of the environment in influencing individuals to

engage in entrepreneurship. This perspective addresses the antecedents of entrepreneurship with emphasis on who becomes an entrepreneur and why? (b) The *behavioral* perspective examines the structure and processes of entrepreneurship activity at the micro level. This perspective addresses questions concerning the social and psychological basis of entrepreneurship such as the formation of entrepreneurial teams. (c) The *constructivist* perspective studies the consequences of entrepreneurial decisions on organizational startup, society, or a community. This perspective investigates the effects of entrepreneurship on interpersonal networks, organizational populations, and communities. (d) The *ecological* perspective studies the influence of the material and cultural environment on economic and institutional development that is distinct from the actions of entrepreneurs. In this perspective, the reference to the individual entrepreneur is considered superfluous (Ruef & Lounsbury, 2007).

Context – “circumstances, conditions, situations, environment that are external to the respective phenomenon that enable or constraint it” - provides individuals with entrepreneurial opportunities and boundaries for their actions. The context is important for understanding “when, how, and why of entrepreneurship happens and who becomes involved” (Welter, 2011: 166-167).

The contextual lens of the sociology of entrepreneurship mainly examines the social context, process, and outcomes of entrepreneurial activity. It differs from other fields such as industrial psychology and economics in three ways. First, its levels of analysis include not only the individual entrepreneur, but also the role played by organizational structure, interpersonal networks, population, as well as the broader institution. Second, it balances the emphasis on material aspects of venture formation (e.g. financing) with the symbolic and cultural dimension of the entrepreneurial activity. And third, it seeks to understand entrepreneurship in diverse contexts such as healthcare, science, and fine arts (Ruef & Lounsbury, 2007).

## A Careers Perspective on Entrepreneurship

There has been a recent surge in interest in viewing entrepreneurship as a career choice (e.g. Burton et al., 2016; Lévesque, Shepherd, & Douglas, 2002; Ng & Stuart, 2016; Rider et al., 2019). A careers perspective on entrepreneurship considers how entrepreneurship can be seen as an employment alternative just like any other job, allowing it to be compared with other employment-related choices that can be analyzed in terms of wages, skills, and mobility. As a majority of individuals begin their careers in established organizations, the nature of these experiences influences an employee’s decision to venture into entrepreneurship. Venturing into entrepreneurship can be viewed as a step along the career trajectory by not only

understanding entrepreneurial activity as shaped by career experience but also understanding career experiences as shaped by the entrepreneurial activity (Burton et al., 2016).

## Organizations, Careers, & Entrepreneurship

A growing body of literature acknowledges that entrepreneurs have work experience prior to venturing into entrepreneurship (e.g. Audia & Rider, 2006; Burton et al., 2002; Feldman, Ozcan, & Reichstein, 2019; Sorenson & Audia, 2000). Using publicly available data from Silicon valley startups, Burton et al. showed that 93% of the entrepreneurs were employed in firms before venturing into entrepreneurship (Sørensen & Fassiotto, 2011). Entry into entrepreneurship can largely be seen as an organizational process (Freeman, 1986). Individuals spend most of their times working in organizations, thus an organization's practice, structures, and policies thereby shape the individuals' experiences. As an increasing part of our lives is spent in organizations it raises an important question – What happens to us in organizations? Answers to this question formulated by use of the term “career” that describes an individual's arrangement of experiences, roles, and relationships in work-related organizations. The word “career” brings with it connotations of progress or development along some course. The word career when taken in terms of the organization, it becomes linked to the word “development” – an individual's roles, experiences, and relationships as developing along some course. The career theorists who focus on organizational career development take the nature and properties of the work setting into account (Dalton, 1989).

The organizational context influences the nature of the career paths of employees and their decisions to venture into entrepreneurship. The contextual perspective is the most common for investigating entrepreneurial entry (Ruef & Lounsbury, 2007). Additionally, research on career mobility investigates the situated nature of the choice of entrepreneurship versus a job switch where individuals evaluate entrepreneurial career options relative to not only their current employer, but also to other employers (e.g. Rider et al., 2019). In this research, I follow Burton et al. (2016) to focus on entrepreneurship as a career choice. More specifically, I look at entrepreneurial entry as a choice of entrepreneurship versus a job switch. This perspective allows me view entrepreneurship as a relative career choice that can be analyzed in terms of wages, skills, and mobility. It also enables me to focus on entrepreneurship as a labor-force status, i.e., a type of labor market activity that is distinct from paid employment (Sørensen & Sharkey, 2014).

I formally distinguish between self-employment and entrepreneurship by focusing exclusively on entry into incorporation by excluding sole proprietorship to better proxy entrepreneurship. The distinction is important because incorporated entries

possess a growth option through limited liability, whereas unincorporated entries mostly represent sole proprietorships (Lazear, 2005; Levine & Rubinstein, 2013). Hence, it is an important distinction, as not separating the two could lead to misleading inferences about entrepreneurship (Henrekson & Sanandaji, 2014; Parker, 2009). The distinction is also important because of different financial entry requirements, access to equity and loans, as well as legal and tax requirements (Edmark & Gordon, 2013). Additionally, incorporated entrepreneurship is associated with the need for strong non-routine cognitive skills such as creativity, analytical flexibility, and complex interpersonal communication skills including persuasion and management, and also likely to be initiated by those who are more highly educated (Levine & Rubinstein, 2017). This understanding has prompted recent entrepreneurship research to focus exclusively on incorporated entrepreneurship as a proxy for self-employment (e.g. Kolvereid & Åmo, 2019). The above reasons indicate that entrepreneurship through incorporated entries is a better proxy for measuring entrepreneurship especially for the highly educated STLF.

## Bureaucracy, Income Inequality, & Entry into Entrepreneurship

The organizational context influences the nature of career paths in their mobility into entrepreneurship and the contextual perspective is the most common perspective for investigating entrepreneurial entry (Ruef & Lounsbury, 2007). Organizational sociology provides vital insights for understanding organizations through the lens of sociology. The study of organizations is a central subfield within sociology (Handel, 2003).

The sociology of organizations begins with the work of sociologist Max Weber, “who believed that bureaucracy was the most efficient form of organization and the pillar of modern society” (Handel, 2003: 5). Americans today do not view bureaucracy as efficient and Europeans also scorned bureaucracy during the late eighteenth century. However, Weber’s view of the technical dominance of bureaucracy makes more sense when compared to other forms of administration. Weber compared modern bureaucratic authority to other forms of authority, such as charismatic and traditional. Charismatic authority (for example religious leaders) is based on exceptional individual qualities rather than on the position or office, while traditional authority (such as monarchies) is based on hereditary superiority. Weber argued that bureaucracy as the rational legal form of authority where “bureaucracies are governed by a set of impersonal rules and procedures that are applied universally, without regard to the personal characteristics of individuals, and rationally designed to serve some broader purpose. Bureaucracies employ

technically qualified, full-time experts assigned to unique areas of responsibility in a logical division of labor” (Handel, 2003: 6).

It has been recently argued that the technological, social, and economic changes have brought about days of fine tuning bureaucratic models and that the day of stable structure are over. Although such claims of changes in technology, society, and the economy have been accompanied by alternative forms of organization (e.g. markets and trust), bureaucracy remains a dominant organizational form (Alvesson & Thompson, 2004; Burtch et al., 2018). Despite the predictions of the disappearance of bureaucracy, bureaucratic structuring is still prevalent in the public and private sector. Sectors such as professional services, healthcare delivery, and open source initiatives are seeing a renewed interest in bureaucratic structuring. It is also being legitimized by the emergence of standards such as ISO 9000 (Adler, 2012). This suggests that it is still relevant to study bureaucracy in modern management.

Bureaucracies still remain desirable employers that offer attractive career opportunities (Clarke, 2013). The concept of a career is typically linked to bureaucracies with classic metaphors such as ladders and treetops, where success is based on hierarchical advancement with ever increasing enumeration (Arnold & Cohen, 2013; Moore et al., 2007). Bureaucratic organizations exemplify an internal labor market with a typical career ladder, where career advancement narrows as one moves up the ladder. Sørensen and Sharkey (2014) argue that the lack of career advancement opportunity in organizations is the reason for employees to venture into entrepreneurship.

Bureaucratic organizations are also known to pay a premium wage to highly skilled employees and are extremely attractive as employers (Cobb & Lin, 2017; Even & Macpherson, 2012; Kalleberg & Van Buren, 1996). Large firms in general pay higher wages than smaller firms. Research suggests that the premium wages are likely to influence greater societal income inequality (e.g. Cobb & Lin, 2017). Focusing on a sample of 5,600 Swedish manufacturing firms from 1976, Hedström (1991) finds that earning dispersion within an organization is closely related to the hierarchical structure of the organization. Firms with greater vertical and horizontal differentiation are likely to have higher wage dispersion, thus suggesting that large, bureaucratic firms influence wage inequality. The literature in sociology examines how the wage settings in organizations influence larger societal income inequality (Cobb, 2016). Research has focused on the role of large firms in affecting the distribution of wages by paying workers more on average than smaller firms, which in general indicates that large firms contribute to the growing income inequality (Cobb & Lin, 2017). Additionally, with an increased return to education (Aghion, 2002; Mouw & Kalleberg, 2010), large bureaucratic organizations are seen as attractive employers by the highly skilled, especially the STLF workforce.

Entrepreneurship research suggests that income inequality influences the career paths of employees, where individuals who are paid relatively higher are more likely



to climb the career ladder than those whose wages are relatively lower. The inequality in the distribution of income is likely to influence an employee's propensity towards entrepreneurship (Andersson Joonas & Wadensjö, 2013; Carnahan, Agarwal, & Campbell, 2012).

In sum, a significant share of entrepreneurs are employed in organizations prior to entry into entrepreneurship. Organizational context influences the career paths of employees and their propensity to engage in entrepreneurship. Bureaucratic organizations are still desirable employers that offer attractive career options, especially for the highly educated such as those from the STL. Bureaucratic organizations are also likely to influence income inequality that probably has an impact on an employee's decision to enter into entrepreneurship.

## The Returns from Entrepreneurship

Entrepreneurship research provides insights by investigating the returns from entrepreneurship – i.e. how entrepreneurs perform in entrepreneurship. The research can be divided into three broad categories. In the first category, researchers investigate how career experiences in organizations influence the initial performance in entrepreneurship. For example, by focusing on the firm level, Delmar and Shane (2006) studied the influence of prior experience on the growth and survival of new ventures. In similar research, Agarwal, Echambadi, Franco, and Sarkar (2004) investigated how employees' prior organizational knowledge influences the development and performance of ventures initiated by ex-employees. Focusing on the firm level, Rauch, Wiklund, Lumpkin, and Frese (2009) identified entrepreneurship studies that examine the relationship between entrepreneurial orientation (EO) and business performance. Elfenbein et al. (2010) suggest that individuals develop human capital as a result of their organizational experience that is used in their entrepreneurial venture and has a positive impact on the early stage performance of the new venture. In another study, Sørensen and Phillips (2011) suggest that the size of the former employer can influence not only the performance of the entrepreneurial venture but also the exit strategies of the entrepreneur.

In the second category, researchers investigate how entrepreneurs perform during entrepreneurship by comparing the income of entrepreneurs to the income of employees in paid employment. For example, by focusing on the individual level, Hartog et al. (2010) study the influence of various cognitive and non-cognitive abilities to compare performance in self-employment with performance in wage employment by measuring the earnings of entrepreneurs. Hartog et al. (2010) measure the return for various cognitive and non-cognitive abilities to compare the income of entrepreneurs with those who are in wage employment. The authors

argue that it is important to compare the two earnings to understand the *relative* value of individual abilities in entrepreneurship and wage employment. Using income as a proxy for returns in entrepreneurship and wages in paid employment, the authors found marked differences in the returns contingent on the ability of entrepreneurs and employees. More importantly, the authors found that the ability resulting from the general experience gained from employment had a significant positive impact on entrepreneurial earnings. In similar studies, Hamilton (2000) investigated the difference in earnings between the self-employed and wage employed and concluded that although entrepreneurs have lower initial earnings and lower earnings growth compared to those in wage employment, they still seem to enter and persist in entrepreneurship.

In the third category, researchers investigate the returns from entrepreneurship for those who enter paid employment after experience in entrepreneurship. Campbell (2013) posits that although there is a vast body of literature that focuses on earnings during entrepreneurial experience and such literature adds to our knowledge of returns from entrepreneurship, it provides an incomplete view of the full rewards associated with entrepreneurship as it is important to consider the earnings post entrepreneurship career. A significant share of entrepreneurs re-enter paid employment after a career in entrepreneurship. Using Danish data, Kaiser and Malchow-Møller (2011) suggest that a significant share of employees who venture into entrepreneurship enter paid employment after experience in entrepreneurship. This understanding has encouraged scholarly interest in examining returns from entrepreneurship among entrepreneurs venturing into paid employment following a career in entrepreneurship. A large body of literature (e.g. Kaiser & Malchow-Møller, 2011; Luzzi & Sasson, 2016) examines the financial returns from entrepreneurship post entrepreneurial experience. In general, the studies examine the returns from entrepreneurship of entrepreneurs who enter paid employment post their entrepreneurial experience by comparing the wages of entrepreneurs with the wages of employees who did not experience entrepreneurship. In general, using human capital theory studies demonstrate how human capital gained by entrepreneurs during entrepreneurship has an impact on their wages on entering paid employment after their experience in entrepreneurship. However, so far research has been inconclusive, with some studies suggesting positive returns (e.g. Luzzi & Sasson, 2016), while others indicate negative returns (Kaiser & Malchow-Møller, 2011) and we cannot say with certainty whether or not entrepreneurship pays.

In summary, a significant body of entrepreneurship research has investigated the returns from entrepreneurship not only at various levels of analysis but also at various stages in entrepreneurship. Studies have been conducted at various levels such as individual and firm level to investigate how firm level characteristics (e.g. firm size) and individual level characteristics (e.g. cognitive skills) influence the returns from entrepreneurship. Additionally, the returns from entrepreneurship are investigated at various stages post entry into entrepreneurship – from initial

performance in entrepreneurship (e.g. entry size, initial income) to returns post entry into paid employment after experience in entrepreneurship (comparing their wages with those of employees). However, research that examines the returns from entrepreneurship post re-entry into paid employment generally focuses on a broader sample and has so far been inconclusive on the rewards associated with entrepreneurship, thus suggesting the existence of a significant gap in the knowledge about the returns from entrepreneurship pertaining to a specific labor force such as STLF.

## The Science and Technology Labor Force (STLF)

The STLF is pivotal for economic growth and has been a topic of significant interest among entrepreneurship scholars. In Sweden, the growth of information and communication technology shifted the focus from a traditional manufacturing driven to a knowledge driven labor force. The entrepreneurial activity in this labor force is related to job growth, innovation, and overall economic development.

The science and technology labor force comprises individuals educated in science, technology, engineering, and mathematics (STEM), which typically includes educational activities across all grade levels— from pre-school to post-doctorate— in both formal (e.g., classrooms) and informal (e.g., after-school programs) settings (Gonzalez & Kuenzi, 2012: 1). The STLF has been pivotal to the economic growth of the United States and played a vital role in technological innovation and sustained economic growth (Deming & Noray, 2018). Martinez (2018) suggests that new developments in science and technology are widely applied across industries, resulting in new occupations that create a demand for specialists. Intuitively, individuals educated in STEM play a vital role in fostering developments in science and technology that result in a demand for a new labor force to cater for the growing needs of new technology. Additionally, science occupations are associated with high social status and rewarded with a high personal income and social prestige (Xie, Fang, & Shauman, 2015). The demand for workers educated in STEM has been growing significantly. Besides their importance at national and global levels, such workers are also important at the personal level. From the need for advanced healthcare to reduce the spread of life threatening disease to developing solutions for tackling climate change, a STEM education is seen as important (Marrero, Gunning, & Germain-Williams, 2014).

Policymakers emphasize the importance of qualified individuals with science and engineering expertise as an integral part of a nation's innovative capacity, as these individuals are endowed with high skills, have creative ideas, and can advance scientific knowledge that is converted into tangible products and services used by the society at large (Freeman & Salzman, 2018; NationalScienceBoard, 2016).

Technological innovation has been responsible for 75 percent of the growth in the American economy since World War II. Science based innovation is particularly important. Societal returns on investments in research and development are estimated to range from 20 to 67 percent. Science and technology based innovation is not possible without a workforce that is educated in STEM (Atkinson & Mayo, 2010).

### **The STLF & Sweden**

The 1980s and 1990s witnessed a growth in Information and Communication Technologies where the prominence of the white-collar labor force increased in comparison with the blue-collar labor force. For example, from the 1970s to the 2000s the share of employees in manufacturing fell from close to 30% to 15%. The technological growth saw the shift towards a labor market that was termed a post-industrial (service) society. The service sector hence witnessed a growth in employment share from less than 60% in 1976 to almost 75% in 2006. The growth in the service sector saw a change in the structure of labor demand, as the labor market demanded jobs that favored the highly educated, thus highlighting the importance of knowledge as a key form of production (Korpi & Tåhlin, 2011). Martynovich, Henning, and Innovation (2018) indicate that from 1990 to 2010, jobs in the knowledge intensive IT services sector in Sweden increased from 30,000 to 104,000. The shift in the labor market from manufacturing driven to knowledge driven led to the rise in demand for highly skilled technological workers in Sweden. Highly educated employees in Sweden have also gained the interest of scholars who study top wage earners in large private firms. For example, Bihagen, Nermo, and Stern (2014) studied the importance of education for women in achieving the highest paid position in Swedish private firms.

### **The STLF & Entrepreneurship**

Besides their relevance to the global labor market and the Swedish labor market, the STLF has become a topic of significant interest in entrepreneurship studies (e.g. Braguinsky et al., 2012; Delmar et al., 2011; Sauermann, 2018; Stenard & Sauermann, 2016). Based on Hayek's theory of knowledge, Delmar et al. (2011) posit that the entrepreneurs from the STLF are important, as they are likely to access technological knowledge and information differently from other entrepreneurs. Delmar et al. base their argument on Hayek's theory of knowledge, wherein due to the fact that individuals differ in the amount of knowledge and information they possess, only certain individuals will have the ability to exploit technological knowledge. This technological knowledge, resulting from personal knowledge and the social and institutional context, forms the basis for identifying entrepreneurial opportunity that can be converted for commercial gains. Delmar et al. further argue

that educational background is the most distinguishing prerequisite for obtaining such technological knowledge.

Delmar et al. (2011) identify important theoretical reasons for suggesting the importance of the STLTF for economic growth. First, being highly skilled, the STLTF possesses knowledge to better understand the economic value of an opportunity and is in an advantageous position to identify opportunities with high potential compared to other entrepreneurs. Second, due to high opportunity costs, these individuals are more likely to exploit such opportunities (Amit, Muller, & Cockburn, 1995). And third, the firm specific tacit knowledge obtained from on the job training and labor market experience is carried over to the new firm once they leave the current firm (Hellmann, 2007).

Shane (2003) highlights the role of education in the exploitation of opportunity, arguing that individuals will be more likely to exploit the opportunity if they are better educated, because the information and skills provided by education are likely to increase the value of the opportunity. Having the information and skills facilitates the “ability to assemble resources, develop strategy, organize and exploit opportunity” – important elements of entrepreneurship. Shane further argues that education increases the stock of information and skills, and individuals who are more educated are more likely to exploit opportunities than individuals who are less educated. Education not only provides the skills needed to increase the likelihood of exploiting opportunity, but also the skills to pursue the opportunity successfully (Shane, 2003: 69). Shane cites previous studies to exemplify that the higher the education, the greater the chances of individuals engaging in self-employment. Providing examples of studies that use the US census data, the author reveals that whites and African-Americans with 16 or more years of education are more likely to venture into self-employment compared to those with 13-15 years of education. Highly educated individuals are also associated with greater wealth accumulation, a consequence of which is the facilitation of self-employment (Killewald, Pfeffer, & Schachner, 2017).

## The Literature on Bureaucracy and Entrepreneurial Entry

A growing proportion of the literature that investigates entrepreneurship from a career perspective focuses on the context of entrepreneurship, especially the organizational context (e.g. Burton et al., 2016; Rider et al., 2019; Sørensen & Sharkey, 2014). The core idea behind the emphasis on the organizational context is the fact that entrepreneurs have organizational experience prior to founding a new firm. Sørensen (2007) investigates the role of bureaucratic work environments on

individual rates of entrepreneurship. More specifically, the study explores how context shapes the likelihood of entrepreneurial activity.

Bureaucratic organizations are atypical organizations where careers are assessed in terms of job ladders and ideas of success are based on hierarchical advancement accompanied by increasing remuneration (Arnold & Cohen, 2013). Bureaucratic organizations are defined by a formal division of labor favoring specialized skills over generic skills. They offer career advancement opportunities and in general pay higher wages than small firms, hence are able to attract highly qualified labor (Cobb & Lin, 2017; Even & Macpherson, 2012; Kalleberg & Van Buren, 1996; Leontaridi, 1998). Careers tend to become typically linked with bureaucratic organizations that flourished in the twentieth century (Moore et al., 2007). Arnold and Cohen (2013) argue that although some scholars view a bureaucratic form of career advancement as an anachronism in modern post-bureaucratic times, the concept of bureaucracy is hard to eliminate. Bureaucracy is still prevalent in the public and private sector (e.g. professional services, healthcare delivery) and it is estimated that it will take about half a century to witness the end of bureaucracy (Adler, 2012; Bennis, 2017). For example, Bidwell, Briscoe, Fernandez-Mateo, and Sterling (2013) discuss how employment practices have changed over the past few decades from inwardly closed and hierarchical to a very open system that is not hierarchical. Employee tenure is reduced and downsizing has become more frequent. In another recent reflection from the editors of the Academy of Management Discoveries, Barley, Bechky, and Milliken (2017) discuss the changing nature of organizational employment in the 21<sup>st</sup> century where jobs have moved from a traditional manufacturing industry to more technical ones, implying the demise of the traditional bureaucratic employment contract where employees exchanged labor and loyalty for job security. Jobs are now being outsourced to low labor cost countries like India and contract jobs are on the rise.

Despite of these changes, Arnold and Cohen (2013) strongly argue that the career concept still has a strong heritage of its bureaucratic lineage. Arnold and Cohen (2013) strongly emphasize the fact that although there may have been changes in employment practices, the concept of careers still tends to be strongly associated with bureaucracies. As Weber argued, “once fully established, bureaucracy is among those social structures which are the hardest to destroy” (Weber, 1922: 328).

## **Theories of Bureaucracy**

Bureaucracy has received attention from sociologists (e.g. Merton, 1968; Sørensen, 2007) and economists (e.g. Schumpeter, 1950) and there are multiple theories of bureaucracy in organization theory (e.g. Gouldner, 1954; Merton, 1940; Selznick, 1949; Weber, 1946). I define bureaucracy as increased role differentiation and specialization within the organization, and the emergence of organizational career tracks (Blau & Schoenherr, 1971; Weber, 1968). Modern studies on bureaucracy

acknowledge an intellectual debt to Weber. Weber focuses on specialized skills and is not “exceptionally attentive” to the human character. Later studies on bureaucracy, such as those by Merton and Selznick, focus largely on the unintended consequences of bureaucracy on organizational members (March & Simon, 1993: 55).

Weber intends to show that a bureaucratic organization is a rational solution to the complexities of problems in the way that bureaucracies overcome the decision making or “computational limits” of individuals or alternative forms of organization (i.e. through specialization, division of labor etc.). Weber argues that through the division of labor, each member of the bureaucracy has a specific task to fulfill. Individuals are trained to specialize in the tasks that are necessary for the firm. Furthermore, Weber states that the primary source of superiority of bureaucratic organizations lies in the specialized knowledge used in the efficient production of goods. The official in a bureaucracy is entrusted with specialized tasks, making it difficult to “squirm out of the apparatus into which he has been harnessed ...the professional bureaucrat is chained to his activity in his entire economic and ideological existence” (Weber, 1922: 337). Weber also suggests that the division of labor in a bureaucracy results in a division of the organization into clear-cut levels, where each level assigns responsibilities to the level below it. It emphasizes formally ranked lines of reporting characterized by the progressive development of skill and knowledge – “the official is set for a “career” within the hierarchical order of the public service. He expects to move from the lower, less important and less well paid, to the higher positions” (Weber, 1922: 333).

Weber differentiates himself from other writers on bureaucracy such as Merton and Selznick. He sees bureaucracy as an adaptive device that focuses on skills rather than on the human character (March & Simon, 1993). Weber argues that “bureaucratization offers above all the optimum possibility of carrying through the principle of specializing administrative functions according to purely objective considerations. Individual performances are allocated to functionaries who have specialized training and who by constant practice increase their expertise” (Calhoun, Gerteis, Moody, Pfaff, & Virk, 2012: 334).

Moving away from Weber, Merton asserts that changes in the behavior of the organizational members stem from factors of the organizational structure. Merton’s propositions are based on the demand for control by the top hierarchy. The demand for control takes the form of “increased *emphasis on the reliability of behavior* within the organization”. Top hierarchy institutes standard operating procedures and control ensures that they are followed (March & Simon, 1993: 57). Merton highlights the “unanticipated” responses of organization members (March & Simon, 1993). Merton (1940:562) suggests that bureaucracies with their rigidly defined roles and emphasis on rules and routines “exert a constant pressure upon the official to be methodical, prudent, disciplined” and “unusual degree of conformity with prescribed patterns of action”. (Sullivan & Baruch, 2009).

Similar to Merton, Selznick emphasizes the demand for control. However, Selznick's model of bureaucracy has propositions based on a demand for control by the top hierarchy through the delegation of authority. This delegation of authority increases the amount of training required for specialized skills and increases competency in relatively small areas. However, the delegation of authority has consequences in terms of a greater bifurcation of interests, leading to more conflicts in organizational sub-units (March & Simon, 1993).

## **Organizational Bureaucracy**

The foundational literature in organization research largely builds upon the work on bureaucracy by scholars such as Weber to examine bureaucracy in the context of organizations. Adler and Borys (1996) suggest that organization research presents two conflicting views of the attitudinal outcomes of bureaucracy – one positive and one negative. The positive one views bureaucracy as providing necessary guidance and clarifying responsibilities at work, thereby easing role stress and helping individuals to be more effective. The negative opinion views bureaucracy as an organizational form that demotivates employees, fosters dissatisfaction, and stifles creativity. Focusing on formalization – one of the core elements of Weber's idea on bureaucracy identified by written rules and procedures – Adler and Borys suggest that the positive or negative outcome of formalization on employee attitudes is a function of whether the formalization enables employees to perform better or merely serves to coerce employee efforts and compliance. In his further work, Adler (2012) suggests that these conflicting views on bureaucracy's effect on employee attitudes triggered debates about the effectiveness of bureaucracy as a dominant organizational form that can be replaced by alternative forms such as markets and social networks. Alder argues that such replacement forms of organization risk losing some of the important advantages of bureaucracy related to the operational performance of organizations and the welfare of employees and the public at large. He further asserts that the disappearance of bureaucracy in modern economies is grossly exaggerated: "Reports of the demise of bureaucratic form of organization are greatly exaggerated" (pg. 244). Additionally, although the emphasis of bureaucracy has been in public sector organizations or in private sector manufacturing organizations (e.g. Grandjean, 1981), the concept of bureaucracy has also extended into studies investigating how bureaucratic characteristics such as the division of labor is applicable to a scientific work environment (e.g. Shibayama, Baba, & Walsh, 2015; Walsh & Lee, 2015).

In summary, research suggests that bureaucracy has stimulated the interest of scholars not only in the past but also in recent times. Although there have been reports questioning the dominance of bureaucracy, it still remains a dominant form of organization hence suggesting that it is a topic that warrants attention. Research also indicates that the characteristics of bureaucracy are broadly applicable to work



environments that are highly scientific and technical in nature, implying that organizations with highly educated employees such as the STLF are likely be influenced by bureaucracy.

## **Bureaucratic Organizations & Sweden**

Besides careers strongly linked to bureaucracies, bureaucratic organizations are also important in the context of the Swedish labor market. Sweden is popularly described as a typical welfare state and a case of a coordinated market economy (CME) where large employers require differentiated employees in terms of occupation and skills. Employers expect employees to specialize in skills that are specific to the production process of the firm. Rational workers are unlikely to invest in firm specific skills, unless backed by social insurance against unemployment or pay changes as such skills are not transferable across firms or production units (Soskice & Hall, 2001). Historically, dominant employers have played an active role in the development of the Swedish welfare state to insure worker investment in firm specific skills, which has come to be supported by the employees as well (Korpi, 2006)<sup>7</sup>. The dominance of large employers in the development of the Swedish welfare state results in a labor market that is segregated into an inner circle consisting of large bureaucratic organizations on the one hand, and smaller organizations on the other (Henrekson & Roine, 2005). The large dominant employers in a production regime have both concentrated resources and specific demands on employees. Employers need employees to specialize in skills that are specific to the firm.

Spilerman (1977) suggested that the labor market be broadly divided into *internal* and *external* labor markets. In an internal labor market (ILM), employees are shielded from non-employees (*external* labor market). Spilerman (1977) argued that jobs in the ILM require employers to invest in workers and provide on-the-job training for complex tasks, with high remuneration and promotion for the most skilled workers so that they remain within the firm and continue to be productive for the employer. Job skills with related remuneration thus seem to be the distinguishing characteristics of ILMs. Highly skilled employees are highly paid for their on-the-job training and the skills are strongly linked to organizational tasks, making them more productive in firm specific skills. Such highly skilled employees are then shielded from the external labor market.

Bureaucratic organizations are characterized as an ILM – jobs within a firm – where career rewards are associated with promotions based on past performance and future potential (Grandjean, 1981; Petersen & Spilerman, 1990). Previous research has

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<sup>7</sup> The reader is guided to Korpi (2006) and other studies such as Swenson, P. A. 2002. *Capitalists against Markets: The Making of Labor Markets and Welfare States in the United States and Sweden*: Oxford University Press., for a detailed discussion on the Swedish welfare state and the emergence of the CME.

found a very strong correlation with the size of the firm and the firm's use of the ILM. In large US firms ILMs are seen as a result of the fierce negotiations about employment terms that took place between the labor unions and management of firms during World War II. By reducing opportunities for discrimination, nepotism, and restricting managerial discretion on wages, collective bargaining agreements help institutionalize bureaucratic routines, which allotted workers to jobs and set their wages. Grandjean (1981) suggests a strong link between the "internal" labor market (ILM) and the "bureaucratic" labor market (BLM). The BLM "shares the main features of the internal labor market, including definite ports of entry, stable employment within a single organization, recruitment of higher officials primarily from those lower in the hierarchy, and hiring and promotion based on established bureaucratic procedures" (Grandjean, 1981: 1059).

One major characteristic of bureaucracy is the division of labor (Weber, 1922, 1946) that helps bureaucracies achieve increases in productivity. Employees of bureaucratic organizations are likely to specialize in skills highly suited for their internal production processes and are also generally well paid. With increasing bureaucracy, employees are likely to undertake a narrow range of tasks rather than a broad range of tasks (Sørensen, 2007). The narrow range of tasks implies that employees from bureaucratic organizations develop human capital that is more specialized than generic. Additionally, the division of labor classifies employees based on their organizational rank that endows them with appropriate skills and knowledge (Mintzberg, 1980). Mintzberg suggests two broad categories, i.e. managers and non-managers, where managers are likely to be endowed with generic skills such as coordination and management of the lower ranked workers, while non-managers are likely to be endowed with more specialized skills (e.g. day to day production activities of the organization).

In related literature that compares large firms and small firms, Granovetter (1984) argues that although small firms also have well-defined promotion ladders and clearly graded positions, the concept of an ILM is hard to sustain for small firms. As a firm's size increases, the number of hierarchies and opportunities for promotion also increase. When promotion opportunities are scarce, workers will look beyond a single organization in a search for alternative career opportunities.

As growth opportunities in bureaucratic organizations become narrower with increasing hierarchies, employees are likely to have limited career advancement opportunities as they move up the career ladder. Employees are likely to either remain in their current position or move out into an alternate position as a means for career advancement. Having greater specialized skills than generic skills also means that the skills are less transferable to a different firm. Such individuals are rather unattractive to a different firm, thereby making entrepreneurship a better alternative than moving into a different firm as an alternate career choice. However, as managers are likely to have more generic skills than non-managers (Mintzberg,

1980), the propensity engage in entrepreneurship is likely to be moderated based on the organizational rank of the employee.

Additionally, employees coming from organizations that are more bureaucratic are more likely to be equipped with higher financial resources, and relatively higher human capital (Kalleberg & Van Buren, 1996) and social capital (Leana III & Van Buren, 1999). On entry into entrepreneurship, a strategy to mitigate risks is to pool one's skills in order to obtain additional human resources, often with former colleagues with complementary skills (Agarwal, Campbell, Franco, & Ganco, 2016). Additional human resources suggests a large entry size that allows the founders to pool resources and share risks. Furthermore, a larger entry size also provides legitimacy and helps the new venture to secure necessary resources (Hallen & Eisenhardt, 2012; Kaplan, Sensoy, & Strömberg, 2009).

In summary, employees from larger, more bureaucratic organizations are likely to be endowed with different skills and knowledge than those from smaller, less bureaucratic organizations. Employees carry their skills and on-the-job training from their prior organizational experience to the new venture, thereby influencing their returns from entrepreneurship – during and on re-entry into wage employment. Bureaucratic organizations are likely to not only influence the employee's decision to venture into entrepreneurship but also subsequent returns from entrepreneurship.

## **Reflection on the literature on bureaucracy & entrepreneurship**

Large bureaucratic organizations form an important part of the organizational landscape. Despite technological, social, and economic changes, the concept of bureaucracy remains dominant in contemporary economies. Weber's argument for bureaucracies as a solution to complex problems is still relevant in modern management. Bureaucracies are also an important part of the Swedish organizational landscape. In general, employees are attracted to large organizations as these organizations offer high enumerations and career growth prospects. Careers are typically associated with bureaucratic organizations where economic rewards are based on universalistic criteria such as education rather than on discriminatory measures such as race or gender. With their emphasis on education, highly skilled employees, especially those from the STLF, are likely to find bureaucratic organizations attractive employers. However, with limited growth opportunities with increasing hierarchy, many employees today are likely to choose between entrepreneurship versus a job switch as a career advancement option. The skills and knowledge gained from work experience are also likely to have spillover effects on the new venture, thereby having an impact on the returns from entrepreneurship.

In entrepreneurship research, the general interest in bureaucracy has motivated scholars to investigate how bureaucracy in organizations influences mobility into

entrepreneurship. Using firm size and age as proxies for bureaucracy, Sørensen (2007) investigated how bureaucracy influences entry into entrepreneurship and found that entry into entrepreneurship decreases with increasing firm size and age. This understanding has motivated several studies in entrepreneurship research (e.g. Elfenbein et al., 2010; Kacperczyk & Marx, 2016; Kacperczyk, 2012; Tåg et al., 2016) to examine how firm size age and number of layers influence the likelihood of employees entering into entrepreneurship, where the findings were in general agreement that employees from smaller and younger organizations are more likely to venture into entrepreneurship than those from larger and older organizations. However, on the specific question of organizational bureaucracy and entry into entrepreneurship, I could only find three studies (see Table 2.1) that investigate the various mechanisms that influence mobility into entrepreneurship. First, Sørensen (2007) investigated how four different contextual mechanisms related to bureaucracy influence entry into entrepreneurship among a broad sample of the Danish labor market. Second, again based on a broad sample of Danish employees, Sørensen and Sharkey (2014) investigated how opportunity structures in organizations influence the decision to engage in entrepreneurship versus a job switch. More recently, Tåg et al. (2016) studied how hierarchies in an organization influence the propensity for entrepreneurship among a broad sample of Swedish workers.

To understand the current literature on bureaucracy and entrepreneurship, I conducted two searches in August 2019 – one in Google Scholar and the other in Web of Science using the search words “Bureaucracy entrepreneurship”. On Google Scholar, Sørensen (2007) was the first result with 403 citations and the fifth result (the first four were studies on bureaucracy related to policy with less than 5 citations each) on Web of Science with 149 citations. This outcome of this search exercise suggests that Sørensen (2007) still constitutes a dominant part of the literature that investigates organizational bureaucracy and entry into entrepreneurship. Table 2.1 presents a list of the three studies that helps to provide an overview of the current understanding in existing research related to bureaucracy and entrepreneurship and the contribution this dissertation aims to make to the entrepreneurship literature.

**Table 2.1.**

The Literature on Bureaucracy and Entrepreneurship

Author & Year	Sample	Dependent Variable	Independent Variable(s)	N (person-year)	Theoretical Perspective	Main findings
(Sørensen, 2007)	Denmark (1980-1997)	Entry into Self-employment	Firm size, firm age	1,232,201	Four different contextual mechanisms (pg. 390-391) – rigidly defined roles, lack of development of entrepreneurial skills, workers inwardly focused, attractive employers	Entry into entrepreneurship decreases with increasing firm size and firm age
(Sørensen & Sharkey, 2014)	Denmark (1990-1997)	Entry into self-employment versus a new job	Firm tenure, wage ceiling, span of control	1,028,290	Human capital theory	1. The odds of entering entrepreneurship as opposed to a job switch increase with increasing tenure. 2. Wage ceiling has a negative effect on the choice of entrepreneurship relative to job switch. 3. With greater span of control, mobility increases more for entrepreneurship than job switch
(Tåg et al., 2016)	Sweden (2001-2008)	Entry into entrepreneurship, self-employment and job switch	Number of organizational layers	16,485,527	Largely empirical with explanations related to ability and preference sorting	Employees in firms with more layers are less likely to enter entrepreneurship, to become self-employed, and to switch jobs. The effects of layers are much stronger for business creation than for job switch and they are stronger for entrepreneurship than for self-employment

## The Literature on Income Inequality and Entrepreneurship

Inequality is a concept covering the *entire* distribution and can be described in various ways. For example, it can be used to describe the variance in income distribution (for example as measured by the Gini coefficient) and the effects of an individual's relative position in the distribution (e.g. wage distribution) (Donovan, 2015; Payne et al., 2017). Income inequality refers to the distribution of income and its variance across members of a collective such as an organization or a country. Income can be derived from a number of sources such as wages, business, and investments. Another distinct but related construct is wealth. Wealth “captures the total value of assets a family or individual owns, including homes, investments, and other savings” (Cobb, 2016: 16). Income inequality differs from other related

constructs such as poverty and social inequality. While poverty relates to the number of individuals living in a state of resource deprivation, social inequality signifies the presence of unequal rewards and opportunities for different positions in society such as race, class, and sex (Cobb, 2016; Sen, 1992).

Increasing income inequality in the developed economies has attracted substantial interest among social scientists and policy makers (see Deaton, 2013; Piketty, Goldhammer, & Ganser, 2014). It is associated with a higher crime rate, greater consumer debt, poor health outcomes but also with individual decision making (Payne et al., 2017). Recently, there has been scholarly interest in understanding the role of organizations in generating societal income inequality (e.g. Cobb, 2016; Cobb & Lin, 2017). Broadly speaking, scholars investigate how organizations affect earning distributions in a broader labor market (e.g. Sorensen & Sorensen, 2007). The remunerations and rewards provided by organizations have consequences on societal income inequality (Cobb & Lin, 2017) and on labor market mobility within and across organizations (e.g. Baron & Bielby, 1980a; Castilla, 2008).

The labor market in Sweden demanded jobs that favored the highly educated with companies paying increased wages for the highly skilled, thus driving up employment as well as wage and earnings inequality. For example, wage inequality for men, measured by the coefficient of variation (CoV), increased from 1968 to 2000 and the wage ratio (P90/P10) of the top 90 to the bottom 10 also increased over the same period (Korpi & Tåhlin, 2011). From 1996 to 2006, the P90/P10 ratio was highest amongst private sector employees (lönebildningsrapporten, cf (Korpi & Tåhlin, 2011). Sweden is seen as “egalitarian utopia by outsiders, but reality is complex” (Cowen, 2014: 1). Waldenström (2008: 95) reports that “Sweden is one of the world’s most ambitious welfare states, with high income tax and an extensive social security system”. Investigating the Swedish income distribution during the period 1991-2006, Waldenström found that labor income before tax increased for almost 70% of the population, most at the top and least at the bottom of the distribution. The picture was almost the same for disposable income, although the increase was larger higher up the income distribution. In related literature investigating the top income shares in Sweden between 1903 and 2004, Roine and Waldenström (2008) indicate that the top one percent of Swedes own 25-40% of the total wealth, a figure resembling American inequality levels.

## **Income Inequality & Entrepreneurship**

Concern with inequalities in access to resources has been a central subject in sociology since the inception of the field (Lippmann, Davis, & Aldrich, 2005). Some social theorists have emphasized the reproduction of wealth by the well-off, while others have focused on the opportunities available to the humble as economies grow, thereby debating the impact of unequal distribution of resources on social and

economic inequality and self-employment, which is seen as a main source of economic inequality (Lippmann et al., 2005).

Research examining the influence of income inequality on individual outcomes such as life satisfaction and happiness suggests that individuals care about their *relative* position in society (e.g. Cheung & Lucas, 2016; Clark et al., 2008; Tsui, 2014). Individuals tend to place more importance on how much better or worse they are in comparison to the others in the collective. More specifically, how well an individual feels about how he or she is doing in society is more affected by his/her relative standing than by the absolute income (Frank, 1985). One's relative position in income distribution influences an individual's attitude, behaviors (Clark et al., 2008), and individual decision making (Payne et al., 2017). Relative income – income more or less than others – is an important determinant of an individuals' decision making.

Relative comparisons have been theorized as important reasons shaping one's satisfaction with income. Partly through the process of social comparison (Festinger, 1954; Suls & Wheeler, 2000), people compare themselves with others to judge their own standing on dimensions such as incomes. An employee's relative income compared to that of the others in the workplace is a strong indicator of an employee's standing in an organization. Employees with a lower relative income, faced with limited growth opportunities within the firm are likely to look for alternate labor market options as a means of moving ahead. Employees with a lower relative income develop upward social comparisons with those employees who have relatively higher earnings, thereby engaging in risk taking behavior caused by the need to earn more (Payne et al., 2017). Applied to entrepreneurship, this understanding has motivated research that seeks to investigate how one's relative position in the income distribution influences an individual's attitude, intention, and decision to venture into self-employment (Andersson Joona & Wadensjö, 2013; Nikolaev & Wood, 2018; Werner, Gast, & Kraus, 2014).

## **Reflection on the Literature on Income Inequality and Entrepreneurship**

Increasing income inequality has become the subject of significant interest among scholars across fields such as economics (e.g. Piketty et al., 2014) and organizations (e.g. Kacperczyk & Balachandran, 2018). Among other things, this literature suggests that societal income inequality is likely to influence individual decision making (Payne et al., 2017). Individuals, in part due to social comparison (Festinger, 1954; Suls & Wheeler, 2000), tend to compare themselves with similar others. Individuals whose earnings are relatively lower are likely to compare themselves with those whose earnings are relatively higher (Ferrer-i-Carbonell, 2005). An employee's career advancement opportunities are likely to be

contingent on the relative position in the income distribution. Employees earning relatively higher wages are more likely to progress up the career ladder than employees earning relatively lower wages (Bloom & Michel, 2002). Additionally, employees earning relatively lower wages are likely to make upward comparisons with those earning relative higher wages (Frank, 1985), potentially influencing their mobility decisions towards entrepreneurship or a job switch.

An interest in the increasing income inequality in many settings today has motivated organizational scholars to investigate how inequality influences mobility not only within organizations but also across organizations and into entrepreneurship. For example, using data from Sweden between 2001 and 2008, Kacperczyk and Balachandran (2018) investigate how inequality (identified by the wage dispersion) influences cross firm mobility. In entrepreneurship research, Carnahan et al. (2012) investigate how inequality (identified by the firms compensation dispersion) influences the likelihood of an employee's mobility into entrepreneurship among workers from the U.S. legal services industry. In general, studies use the Gini coefficient to capture inequality at the organizational level to investigate employee mobility across organizations and into entrepreneurship.

However, the literature also suggests that an individual's relative income is an important determinant of individual outcomes such as morale and satisfaction (Breza, Kaur, & Shamdasani, 2017; Cheung & Lucas, 2016) indicating that relative income is likely to be an important determinant of an employee's mobility decisions. In entrepreneurship research, this understanding has motivated scholars to investigate how an individual's relative income influences his/her propensity for entry into entrepreneurship. For example, Nikolaev and Wood (2018) reveal how an individual's relative position in the income distribution moderates the relationship between the proportion of entrepreneurs in a regional cohort and an individual's propensity for entrepreneurship. In a related study, Andersson Joona and Wadensjö (2013) investigate how wage-earners in various parts of the residual distribution leave paid employment for entrepreneurship.

Table 2.2 presents a list of studies that investigate the relationship between relative income and entry into entrepreneurship. The list was obtained from Google Scholar and Web of Science using the search terms "relative wage" "entrepreneurship", "relative income" "entrepreneurship", "relative wage" "self-employment" and "relative income and self-employment". To the best of my knowledge, there are only four studies four studies that look specifically at how an individual's relative wage influences entry into entrepreneurship or self-employment. This list provides an overview of existing research that investigates the influence of an individual's relative income on mobility into entrepreneurship and provides an understanding of the contribution this dissertation makes to the entrepreneurship literature



**Table 2.2.**

The Literature on Relative Income and Entrepreneurship

Author & Year	Sample	Dependent Variable	Independent Variable(s)	N (person-year)	Theoretical Perspective	Main findings
(Schneck, 2011)	Germany (1999, 2001, 2003, 2005, 2007, 2009)	Entrepreneurial motivation	Relative wage	7,211	Income comparisons	U-shaped relationship between relative wage position and propensity for entrepreneurship
(Andersson Joona & Wadensjö, 2013)	Swedish born males (2001)	Self-employment, job switch, unemployment Additional analysis for incorporated (and unincorporated) firm with (and without) employees, income in self-employment	Absolute wage, relative wage	935,530	Largely empirical with brief explanations around ability and productivity (pg. 157).	1. Receiving lower (or higher) income than predicted increases probability of entering self-employment. 2. Those who belong to the top are more likely to start incorporated firms 3. Individuals earning higher than predicted perform better in self-employment than individuals earning lower than predicted.
(Werner et al., 2014)	Germany (2009)	Propensity for entrepreneurship	Relative wage	4,382	Wage comparisons	1. Employees who perceive their current wage level as very unfair are more likely to have higher entrepreneurial intentions. 2. The closer actual wages get to the wage levels perceived as fair, the more employees are likely to remain in their current employment.
(Nikolaev & Wood, 2018)	US General Social Survey (GSS) & HILDA (Australia)	Preference for self-employment and entry into self-employment	Regional cohort self-employment (moderator: relative wage)	3,018 (GSS) and 124,908 (HILDA)	Social comparison	Individuals in the top 20% of the income earners are more likely to engage in self-employment than those in the bottom 20%.

## The Literature on Returns from Entrepreneurship

Research in entrepreneurship suggests that in order to investigate entrepreneurship as a career, entry into entrepreneurship can be viewed as a step along the career path. It is important to not only understand how the entrepreneurial activity is shaped by the career experiences but how subsequent career experiences are shaped by the entrepreneurial experience (Burton et al., 2016). As employees venture into entrepreneurship as a result of a utility maximizing decision (Douglas & Shepherd, 2000), the decision to venture into entrepreneurship is driven by individual level costs and benefits associated with entrepreneurship. A number of studies in entrepreneurship emphasize the costs associated with entrepreneurship (see

Shepherd, Williams, & Patzelt, 2015) and the benefits of entrepreneurship during (e.g. Hamilton, 2000) and post entrepreneurial experience (e.g. Daly, 2015).

The rewards (or returns) associated with a career in entrepreneurship can be examined in terms of pecuniary (e.g. Berkhout, Hartog, & Praag, 2016) or non-pecuniary (e.g. Andersson, 2008; Caliendo, Fossen, & Kritikos, 2014) benefits associated with entrepreneurship. Hartog et al. (2010) indicate that in order to understand the returns from entrepreneurship, it is important to compare the earnings of entrepreneurs *relative* to those who are wage employed. In general, existing literature that focuses on returns from entrepreneurship examines the rewards by comparing the income of entrepreneurs with the wages of employees in wage employment. Additionally, the literature largely uses human capital theory to examine the returns from entrepreneurship during and post entrepreneurial experience. Bruce and Schuetze (2004) suggest that self-employment can either be viewed as a human capital enhancement program where self-employment experience can enhance earnings or as a labor market activity that causes the stagnation of job specific skills leading to reduced earnings. This indicates that human capital from the entrepreneurial experience is the key determinant of the returns from entrepreneurship. Although human capital is an important determinant of the subsequent income of entrepreneurs on re-entry into paid employment, research suggests that firm characteristics can confound the human capital of the individuals in a way that is likely to affect the productivity of employees, thereby influencing their wages (Burton et al., 2017). As larger and older firms are generally more bureaucratic, they have different skill requirements from smaller and younger firms (Elfenbein et al., 2010; Sørensen, 2007). This suggests that the returns from entrepreneurship on re-entry into paid employment are likely to differ based on the bureaucratic nature of the employer.

## **Human Capital, Bureaucracy and Returns from Entrepreneurship**

Human capital theory has evoked significant interest among entrepreneurship scholars and is of distinct importance for entrepreneurship research (Marvel, Davis, & Sproul, 2016). Human capital is considered important for discovering, creating and identifying entrepreneurial opportunities (Shane, 2003; Shane & Eckhardt, 2003) that help acquire financial resources and launch ventures (Dimov, 2010). Additionally, the entrepreneurship literature links human capital attributes such as education and experience to entrepreneurial outcomes such as firm growth and profitability (Unger, Rauch, Frese, & Rosenbusch, 2011). Indeed, Becker argued – “human capital is by far the most important form of capital in modern economies” (Becker, 2002: 3).

Broadly speaking, human capital refers to the knowledge, ideas, and skills of individuals (Becker, 1964; Becker, 2002). Human capital can be acquired through schooling, on-the-job training, vitamin consumption, medical care, and through

access to information about the economic system (Becker, 1962). Human capital can broadly be categorized as general and specific. General human capital is valuable across multiple firms in addition to the firm that provides training for those skills. For example, a machinist who was trained in the army finds the skills of value to firms in the steel and aircraft industries, while a doctor trained in one hospital finds his/her skills equally valuable in another hospital. General human capital increases the marginal productivity of the employee by the same amount in the firm that provides the training. On the other hand, specific human capital increases the productivity of the individual more in firms that provide on-the-job training, while completely specific training has no effect on the productivity of the trained employees in another firm (Becker, 1962). However, Lazear (2009) provides a broader approach, suggesting that all human capital is generic and that firms differ based on the weights attached to the skills. For example, accounting and computer programming are generic skills, but there may be only one firm that needs workers trained in all these skills.

The entrepreneurship literature suggests that entrepreneurship is a labor market activity that endows individuals with more generic skills than specific skills (Lazear, 2005). Entrepreneurship can be envisaged as a journey (McMullen & Dimov, 2013) that requires time to develop and master the necessary skills. As entrepreneurs spend more time in entrepreneurship, they are likely to find a better match to entrepreneurship. The initial skills of entrepreneurs are likely to differ from their skills at the later stage of entrepreneurship (Yang & Aldrich, 2017) due to the influence of entrepreneurial experience on the human capital. As entrepreneurs spend more time in entrepreneurship, they are likely to enhance their human capital from their entrepreneurial experience, thereby influencing their returns from entrepreneurship. However, moving in and out of entrepreneurship is also likely to depreciate human capital from entrepreneurship (Parker, 2013). Therefore, an entrepreneur's human capital from experience in entrepreneurship is likely to differ based on the time spent in entrepreneurship and the number of spells in entrepreneurship.

Although the returns from entrepreneurship for entrepreneurs re-entering paid employment is likely to be dependent on the human capital gained by the entrepreneur from the entrepreneurial experience, there exists heterogeneity among firms based on aspects such as skill requirement, rewards, and complexity. For example, larger firms that are in general bureaucratic, expect employees to have specialized skills (Sørensen, 2007) that hinders development of human capital suitable for entrepreneurship. On the other hand, smaller, less bureaucratic firms expose employees to a wide variety of roles, activities, and multiple functional areas (Kacperczyk & Marx, 2016) that enables employees in smaller firms to develop human capital that is suited to entrepreneurship, suggesting a better match to entrepreneurship.

Research suggests that better matched employees are likely to be more productive compared to those who are less well matched (Jovanovic, 1979). On entry into entrepreneurship, an entrepreneur's human capital is likely to differ based on the bureaucratic nature of the entrepreneur's employer prior to entry into entrepreneurship. As entrepreneurship requires more generic than specific skills (Lazear, 2005), entrepreneurs from smaller, less bureaucratic firms are likely to find that their previous employment skills are a better match with entrepreneurship compared to entrepreneurs from more bureaucratic firms. In a similar vein, entrepreneurs re-entering smaller, less bureaucratic firms are likely to find a better match of their skills from entrepreneurship compared to entrepreneurs re-entering larger, more bureaucratic firms. As matching is key to employee productivity, those who are better matched with their jobs are likely to draw higher rewards than those who are less matched to their jobs (Jovanovic, 1979).

In summary, the research suggests that human capital from the entrepreneurial experience is likely to be dependent on the time spent in entrepreneurship and the number of spells in entrepreneurship that is likely to influence the wages of entrepreneurs re-entering paid employment. However, firms differ based on their bureaucratic characteristics, which is likely to confound the human capital of the entrepreneur. Wages of ex-entrepreneurs re-entering paid employment are likely to be contingent not only on the bureaucratic nature of the entrepreneur's employer prior to entry into entrepreneurship but also on the bureaucratic nature of the entrepreneur's re-entering employer.

## **Reflections on the literature on Returns from entrepreneurship**

Several studies in entrepreneurship investigate returns from entrepreneurship not only during entrepreneurship but post entrepreneurship on re-entry into paid employment. Much of this research uses human capital theory as the key theoretical basis to determine the income of entrepreneurs relative to wage employees. However, research suggests that the bureaucratic nature of the entrepreneur's employer is likely to confound the human capital of the entrepreneur, thus potentially influencing subsequent wages in paid employment.

Table 2.3 illustrates the existing entrepreneurship literature that investigates returns from entrepreneurship during and post entrepreneurship (I thank Karl Wennberg for allowing me to use the initial list of research articles he created, to which I added further relevant articles). A closer examination of the table suggests that the topic of returns from entrepreneurship has been of scholarly interest not only in the past (e.g. Evans & Leighton, 1989) but also in recent times (e.g. Luzzi & Sasson, 2016). Studies have focused on labor markets in countries such as U.S., Sweden, Denmark, Norway, Korea, and Finland, thereby suggesting the interest of entrepreneurship scholars across a broad spectrum of labor markets. In general, the studies evaluate the returns from entrepreneurship by comparing the incomes of entrepreneurs with

similar employees to identify either positive or negative returns. For example, Luzzi and Sasson (2016) suggest positive returns from entrepreneurship, while Bruce and Schuetze (2004) suggest negative returns. Although there are several studies that investigate the returns from entrepreneurship, research is still inconclusive about whether or not entrepreneurship pays, thereby suggesting that the topic warrants further investigation.

**Table 2.3.**  
Literature on Returns from entrepreneurship<sup>8</sup>

Author and Year	During or Post Entrepreneurship	Sample	Main Findings
(Evans & Leighton, 1989)	Post	USA; 1979-1998; 1,349 obs.	No difference in earnings for ex-entrepreneurs returning to wage employment
(Ferber & Waldfogel, 1998)	Post	USA; 1979-1993; 8,503 obs.	Higher returns for men who were self-employed in incorporated firms than women in general
(Hamilton, 2000)	During	USA; 1983-1986; 7,670 obs.	Median entrepreneurial earnings are 35 percent less than the predicted alternative wage on a paid job of the same duration,
(Williams, 2000)	Post	USA; 1979-1994; 3104 males and 2839 females	The return to self-employment experience is lower than the return to paid employment
(Bruce & Schuetze, 2004)	Post	USA; 1979-1990; 6 098 men and 2 229 women	Relative to continued wage employment, brief spells in self-employment do not increase—and probably actually reduce—average hourly earnings upon return to wage employment.
(Williams, 2004)	During	USA; 1979-1990; 11,281 teenagers and young adults	Those who engaged in teenage self-employment were found to earn between 11 and 14 percent less than others at age 27.
(Hyytinen & Rouvinen, 2008)	Post	15 EU Countries; 25,238 individuals	Unconditionally, those re-entering paid-employment appear to have considerably lower wages than those staying in the wage sector. This difference appears to be larger in Europe than in the US.
(Hartog et al., 2010)	During	USA; 1979-2000; 49,764	Income is higher for entrepreneurs than for employees due to the fact that general ability pays off better in entrepreneurship than in employment.
(Åstebro, Chen, & Thompson, 2011)	During	Korea; 1998-2007; 17,603 individuals	Self-employed earn less than observationally equivalent wage workers.
(Andersson, 2011)	Post	Sweden; ;221,880 obs.	Relative to continued wage employment, self-employment, with few exceptions, does not improve outcomes in the wage sector for immigrants and may in fact be associated with lower earnings and difficulties returning to paid employment.
(Kaiser & Malchow-Møller, 2011)	Post	Denmark; 1990-1996; 299,177 Danish men	Spell in self-employment is associated with lower hourly wages compared to workers continuously wage employed. However, the effect disappears – and positive in some settings – for ex-entrepreneurs who find employment in the same sector as their self-employment sector

<sup>8</sup> Although the table contains a list of important studies conducted on this topic it is not exhaustive

**Table 2.3 (contd...)**

Literature on Returns from entrepreneurship

Author and Year	During or Post Entrepreneurship	Sample	Main Findings
(Theunissen, Verbruggen, Forrier, & Sels, 2011)	Post	Belgium; ;44,384 obs.	Insignificant effect of self-employment spell on wages post re-entry
(Baptista, Lima, & Preto, 2012)	During	Portugal; 1986-2003;156,412 obs.	Depends on short-term and long-term effects. In the first five years, the return to self-employment is lower than the return to wage employment. In the sixth year of experience, the return of the ex-business owner experience is 11% while the return of the wage employment is 9%. Former business owners enter firms at higher job levels and progress faster up the hierarchy than wage employees without entrepreneurial experience.
(Campbell, 2013)	Post	USA; 1990-2004;70,104 obs.	Positive effects of a start-up experience on future earnings outside of the entrepreneurial firm. A matched sample of employees with or without start-up experience revealed that post-entrepreneurs exhibited 50% higher earnings three years after leaving entrepreneurship for wage work, compared to the year prior to joining the start-up.
(Hyytinen, Ilmakunnas, & Toivanen, 2013)	During	Finland; ; 6,055 Twin Cohort study	Entrepreneurs have a negative earnings premium
(Daly, 2015)	Post	USA; 1971-1981;140 (treated), 5404 (matched)	After 15 years, no significant evidence that individuals who attempt self-employment are punished for doing so: after 15 years, those who attempt self-employment receive an (insignificant) 8% and a (significant) 22% premium in labor income and in labor and asset income, respectively. The consequences of attempting self-employment vary by occupation: individuals in technical and professional occupations achieve significant gains, of 45% to 62% after 15 years, whereas craftsmen see no significant differences in income.
(Luzzi & Sasson, 2016)	Post	Norway; 1999-2012; 6,663 individuals (treatment) and 458,818 individuals (control)	Individual entrepreneurs earn 19% more on average than switching employees

**Table 2.3 (contd...)**

Literature on Returns from entrepreneurship

Author and Year	During or Post Entrepreneurship	Sample	Main Findings
(Manso, 2016)	During	USA; 1979-2012; 57,773 obs.	After the first couple of years entrepreneurs earn approximately 10% more than salaried workers with similar characteristics.
(Pardo & Ruiz-Tagle, 2016)	During	Chile; 2002,2004,2006; 14,691 obs.	Experience of being self-employed has a negative impact on earnings than experience as a wage earner.
(Van Praag & Raknerud, 2017)	During	Norway; 2002-2011; Incorporated (M: 15,459; W:3,474), Self-employed (M:33,808; W:10,495), Reference(M:544,883; W:417,783)	Average returns to entrepreneurship are significantly negative for self-employment while modest, but significantly positive, for incorporated startups.
(Failla et al., 2017)	Post	Denmark; 1999-2008; 8802 entrepreneurs and 2,105,029 non-entrepreneurs	Entrepreneurs are penalized upon re-entering the labor market
(Sorgner, Fritsch, & Kritikos, 2017)	During	Germany; 2009 ;262,449 obs. (paid employees and self-employed)	Compared to employees in paid employment, the income gap is positive for self-employed with employees and negative for solo self-employed
(Härsman, Mattsson, & Hovsepian, 2018)	During	Sweden; 2008; 13,800 Master of Science in Electrical Engineering	The results show that the average return to self-employment is less than 5% in all regions and smaller in the Gothenburg and Malmö region than in the other two regions.

## Conclusion

Investigating entrepreneurship as a career has been of growing interest to scholars. Viewing entrepreneurship as a career allows us to situate entrepreneurship as a step along the career trajectory. The nature of organizational career paths influence an employee's decision to venture into entrepreneurship and the returns from entrepreneurship – during and post entrepreneurial experience. The sociological lens of entrepreneurship provides tools and resources to examine how organizational contexts affect the career paths of employees. Large bureaucratic organizations, also important in the Swedish context, are attractive employers especially for the STLFF. The division of labor in large bureaucracies is likely to endow employees with different skills and knowledge from skills and knowledge from smaller, less bureaucratic organizations. An employee's propensity to enter into entrepreneurship compared to a job switch is likely to be contingent on the bureaucratic nature of the employer. More bureaucratic organizations are also likely to endow employees with different resources than less bureaucratic organizations, which is likely to influence the entry size in entrepreneurship. Additionally, income inequality, identified by the relative income is likely to influence individual decision making, in part through the process of social comparison. Employees with a lower relative income are likely to compare themselves with those who have a higher

relative income. An employee's career advancement opportunities are likely to be contingent on the relative position in the income distribution, thereby influencing an employee's propensity for mobility into entrepreneurship. Those with a lower relative income are also likely to be endowed with different resources than those with a higher relative income, which is likely to influence the initial returns from entrepreneurship. However, examining the initial returns from entrepreneurship provides an incomplete view of entrepreneurship and there is a need to examine the returns from entrepreneurship post a career in entrepreneurship. A significant share of entrepreneurs re-enter paid employment after a career in entrepreneurship. Entrepreneurship endows entrepreneurs with human capital that is contingent on the number of years and the number of spells in entrepreneurship that is likely to influence subsequent wages on re-entry into paid employment. However, firm heterogeneity in terms of skill requirement is likely to confound entrepreneurs' human capital, thus influencing their returns from entrepreneurship post re-entry into paid employment.

## Important Concepts & Definitions

Table 2.4 provides a list of the important concepts with their definitions on which this research is based. The table contains the concept, its definition and the source of the definition. For example, in this research, entrepreneurship is viewed as entry into incorporated entrepreneurship.

**Table 2.4:**  
Important Concepts & Definitions

Concept	Definition	Source
Bureaucratic organizations	Organizations with increased role differentiation, specialization, and organizational career tracks	Based on (Blau & Schoenherr, 1971; Weber, 1968)
Career	"an individual's work-related and other relevant experiences, both inside and outside of organizations, that form a unique pattern over the individual's life span"	Sullivan and Baruch (2009: 543)
Human capital	Investments in education and training	Becker (1994)
Entrepreneurship	Entry into (incorporated) entrepreneurship	Levine and Rubinstein (2017)
Relative income	Income more or less than others	Cheung and Lucas (2016)
Labor markets	"Arenas where workers exchange the labor power for wages and other job related awards"	Kalleberg and Sorensen (1979: 351)
Science, Technology, Engineering & Mathematics (STEM) education	Individuals with educational qualifications in science, technology, engineering, and mathematics	Gonzalez and Kuenzi (2012)
Returns from entrepreneurship	Financial returns to self-employment	Hamilton (2000)
Entrepreneurial experience	"past involvement in founding a business"	Toft-Kehler, Wennberg, and Kim (2014: 454)
Job Matching	Person-environment fit	Jovanovic (1979)
Science and Technology Workforce (STLF)	Individuals educated in Science, Technology, Engineering, & Mathematics	N.A





# 3. Data & Methods

This chapter introduces the reader to the research methodology used in this dissertation. The chapter begins by informing the reader about the research motivation behind the four studies, which is followed by a description of the level of analysis and the source of the data used in this dissertation. The chapter concludes by providing the reader with some basic information about the individuals from the STLF in Sweden and also compares them with non-STLF individuals in Sweden.

## Research Motivation and Outline of the Four Studies

With an educational background in Computer Science and extensive work experience in large semiconductor companies prior to venturing into entrepreneurship, the main reason for embarking on a PhD in entrepreneurship was my ardent interest in understanding the precursors for employees to pursue a career in entrepreneurship versus a job switch. The following question was rather intriguing – why entrepreneurship as a career over a career in wage employment? Motivated by this question, as well as my professional and educational background in the technology industry, I had informal interactions with a few entrepreneurs (ex-employees from large firms) in the technology sector in Sweden to understand their reasons for pursuing an entrepreneurial career. I found motivations such as employees being stifled in large bureaucracies due to reasons such as the need for rigid adherence to job descriptions that made them unable to attempt new ideas in the previous firm and monotony due to repetitive daily activities. My interactions with the entrepreneurs suggested that entrepreneurship represented an attractive career option compared to moving to another job. Study 1 and the exclusive focus on STLF entrepreneurs was a result of that interaction. Study 2 evolved as a result of my interest in reading the literature on income inequality that happened to be part my admission application for the PhD program at Lund University, which involved studying the growing income inequality in Sweden. The rising concern about the growing income inequality across countries and the role of entrepreneurs in driving this global trend motivated the second study. The first two studies look at the antecedents to an entrepreneurial career by investigating how two characteristics of organizations – bureaucracy and income inequality – influence entry into entrepreneurship instead of a job switch. Entry into entrepreneurship can either

happen through self-employment or incorporated entrepreneurship. I examine entry into entrepreneurship by focusing on incorporated entrepreneurship – motivated by the literature (e.g. Levine & Rubinstein, 2017) that suggests incorporated entrepreneurship involves activities that require strong non-routine cognitive skills such as creativity and analytical thinking and is likely to be engaged in by individuals who are more highly educated. This dissertation's focus on highly educated STLF individuals made me think of incorporated entrepreneurship as a better proxy than mere self-employment.

However, in my view studying entry into entrepreneurship does not provide a complete understanding of entrepreneurship as a career because it is important to comprehend what happens not only prior to entrepreneurship but also post entrepreneurship. To evaluate an entrepreneurial career, it is essential to not only understand the antecedents to an entrepreneurial career but also the outcome of the career. Individuals leave a stable career in wage employment and forgo career advancement opportunities that would have occurred had they remained in wage employment. The next logical question is – was the career choice to venture into entrepreneurship worth it? As I read the literature on entrepreneurship, and with my own practical experience, I realized that entrepreneurship is not an easy journey. Entrepreneurs “sweat and toil” on that arduous path, investing time and money to achieve their initial dreams. This inspired me to read more of the entrepreneurship literature that investigates the returns from entrepreneurship and became aware that many entrepreneurs move back into wage employment after their experience in entrepreneurship. To me, this question of understanding the value of the decision to pursue a career in entrepreneurship becomes all the more pertinent if entrepreneurs move back into wage employment.

Motivated by the importance of this question, I initiated Study 3 and Study 4 to examine the outcome of the choice of entrepreneurship by investigating the wages of entrepreneurs who move back into paid employment after a spell of entrepreneurship experience. Indeed, the “worth” of the decision to venture into entrepreneurship can be examined through various lenses – e.g. worth in terms of independence (Douglas & Shepherd, 2000), knowledge of skills such as planning (Shane, 2003), or happiness (Andersson, 2008). However, to approach the dissertation in a systematic manner, I had to pick one aspect of entrepreneurship that can be examined. After careful review of existing literature, I decided to opt for wages, as current literature (e.g. Kaiser & Malchow-Møller, 2011; Luzzi & Sasson, 2016) focuses on wages to examine the returns from entrepreneurship for ex-entrepreneurs moving into wage employment. This not only allowed me to make a direct comparison with these studies but also helped me to construct a coherent story that brings together the various elements of the overarching research question. In summary, each of the four studies makes different contributions to research on entrepreneurial careers and taken together they provide an overview of the factors

that influence employees to venture into entrepreneurship instead of a job switch, in addition to the career outcome of the decision to venture into entrepreneurship.

## Level of Analysis and the Employee Entrepreneur

A key point of this dissertation is that an entrepreneurial career can be analyzed by examining the career choice of entrepreneurship versus a job switch and the outcome of that career choice by examining the returns from entrepreneurship. As careers have social and economic outcomes for an individual (Arthur & Rousseau, 2001), in this dissertation I focus on the individual as the unit of analysis.

Entrepreneurship literature recognizes that individuals are the foundation of the entrepreneurial process: they are vital in the recognition (Davidsson, 2015; Shane, 2003), discovery, creation (Alvarez & Barney, 2007, 2008), and exploitation (Hébert & Link, 1989) of opportunities. Although some studies have criticized the emphasis on the individual entrepreneur and call for a greater focus on the contextual factors (Gartner, 1988), my view is that to understand entrepreneurship as a career it is important to emphasize the individual entrepreneur as it reveals his/her social and economic outcome. Additionally, a significant proportion of entrepreneurs have work careers prior to entering entrepreneurship (Sørensen & Fassiottto, 2011), making employees important elements of entrepreneurship. Employees face the following choices in their careers - either continue being employed in the same firm, transition into entrepreneurship or a job switch. The first two studies of this dissertation focus on this choice by examining organizational factors that affect an employee's career choice of entrepreneurship versus a job switch. However, just examining the choice of entrepreneurship reveals an incomplete story of an employee's decision to engage in entrepreneurship and thereby warrants further examination of the outcome for the employee. Throughout this dissertation, I focus on the employee entrepreneur as the unit of analysis, with a different analytical approach in each empirical study. This is illustrated in the following section that discusses the research design of the studies.

## Research Design of the Empirical Studies

The research design of the empirical studies in the dissertation primarily uses observational data and controls for additional factors that the literature suggests may affect the predicted hypotheses. Although I draw upon relevant theoretical literature to arrive at the predictions, the methodological approach in the various studies in this dissertation is limited to a quantitative analysis of observational data drawn from various public registers in Sweden and provided by Statistics Sweden (SCB,

Swedish acronym for Statistiska centralbyrån) for the years 1990 to 2008. The SCB is responsible for the official statistics in Sweden and collects information from surveys around the country. The SCB ensures that the collected information meets quality requirements that strengthen the reliability of the data. As evidence of their quality standards, the SCB has received the ISO (International Standards Organization) 20252:2012 for market, opinion, and social research surveys<sup>9</sup>. The data provided by the SCB contain information on all men and women registered and working in Sweden over the age of 16 years. Besides information on individuals, the data also provide information on the incorporated firms registered in Sweden. The research specifically uses the Longitudinal Database for Health Insurance and Labor Market Statistics (LISA, in accordance with the Swedish acronym)<sup>10</sup> and complements this dataset with information from various other registers such as the activity register and the business register. The activity register, for example, contains information from the Swedish National Income and Tax Registers and the Employment Register. Together, the datasets make it possible to link individuals to workplaces (Witte, 2014), allowing examination of a richly linked employee-employer dataset. However, the survey data does not contain information about for e.g. the employees' attitudes and motivation. Therefore, the inferences drawn from this dissertation are limited by the choice of data and the methods used (Wennberg, 2011). The analysis of the data is performed using the Stata<sup>11</sup> statistical software package.

In this dissertation focusing on the pre-entrepreneurship antecedents and post-entrepreneurship outcome of an entrepreneurial career, the empirical material available contains the necessary features and attributes that aid in empirically capturing the theoretical predictions in the various hypotheses. The dataset from the SCB has some notable advantages. First, the dataset enabled me to use the full population of individuals and firms as opposed to a sample of individuals or firms. Second, the datasets made it possible to link firm and industry level information into a single dataset, thereby allowing additional analysis to include industry level information (Delmar et al., 2011). Such a rich dataset facilitates individual level, firm level, and industry level analysis. Additionally, the data allowed me to isolate entry into entrepreneurship through incorporation and self-employment, an important distinction made in this research.

The primary goal of the dissertation is to examine entrepreneurship as a career by investigating the antecedents to entry into entrepreneurship versus a job switch and the outcome of the choice of entrepreneurship. The entrepreneurship literature suggests that there can be several antecedents to entrepreneurship – for example,

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<sup>9</sup> <https://www.scb.se/en/About-us/>

<sup>10</sup> For details, see <http://www.scb.se/lisa-en>

<sup>11</sup> For more details refer <https://www.stata.com/>

autonomy (Benz, 2009), need for achievement (McClelland, 1961), and risk tolerance (Koudstaal et al., 2015). However, as a single study cannot possibly examine all the antecedents and outcomes of the decision to venture into entrepreneurship, each of the four studies in this dissertation focus on important elements of the antecedents and the outcome. In each study, I focus either on the antecedents (Study 1 and Study 2) of the career choice of entrepreneurship versus a job switch or on the outcome (Study 3 and Study 4) of the decision to venture into entrepreneurship. I try to use empirical models whose outcome and predictor variables have been tested in relevant previous studies (e.g. variables on bureaucracy, returns from entrepreneurship). Such an approach will allow other researchers to replicate and reflect on the theoretical models and compare the empirical results.

## Description of the Variables

This dissertation is divided into four studies. Each study examines a specific research question that jointly answers the overarching research question. Each study therefore requires different information from the data provided by the SCB. This information is available in the form of various variables extracted from the data. For example, the first study examines the influence of organizational bureaucracy on employee mobility - entrepreneurial entry versus a job switch. The information on organizational bureaucracy, typically measured using proxies such firm size and firm age (Sørensen, 2007) is extracted from the data provided by the SCB. The SCB provides information on the total number of employees in an organization through the variable *Org\_AntalSys* that is then used to perform analysis by means of an appropriate statistical method. Similarly, other studies in this research require information that is available through the list of variables provided by the SCB.

Table 3.1 provides a list of the variables that are used in each of the four studies, accompanied by the corresponding description. For example, *LoneInk* is the name of the variable provided by the SCB that contains information on employee salary.

The list presented in Table 3.2 contains the details of the variables used in the dissertation that made it possible to test the hypotheses using dependent variables, independent variables, and various controls at the individual, firm, as well as industry level. For example, one of the most important dependent variables in one of the hypotheses is the decision by an employee to venture into entrepreneurship instead of a job switch. The employment status (*YrkStalln*) variable allows the capture of information on the labor market status of the employee. More specifically, the variable indicates whether the employee is engaged in wage employment, or is self-employed in an incorporated or unincorporated firm. Additionally, variables such as gender (*Kon*), age (*Alder*), and Civil Status (*Civil*)

allow controls at the individual level. Similarly, variables such as the organization identifier (*LopNr\_PeOrgNr*) allows for control at the organization level. The organization identifier can also be used to extract information about whether a firm has ceased operation during the year in question. Such information provides an indication of voluntary or involuntarily transitions into entrepreneurship (assuming that there has been a transition into entrepreneurship for an employee of the firm). Finally, the data also provide variables such as the SNI codes (*sni*) that allowed me to include various industry level controls.

**Table 3.1**

List of variables used in the four studies

	Dependent Variables	Independent Variables	Controls
Study 1	1. Mobility: The variable is coded 0 for no change, 1 for entry into incorporated entrepreneurship, and 2 for a job switch, 2. Entry size	Firm size (categories), firm age (categories), firm layers, rank (managers and non-managers)	Age, gender, married, #children, #children under 6, wage, Stockholm, firm tenure, capital income, sum of job changes, PhD, firm dissolution, year, occupation, industry
Study 2	1. Mobility: The variable is coded 0 no change, 1 for entry into incorporated entrepreneurship, and 2 for a job switch. 2. Entry size 3. Initial income	Relative income (income from wage employment), rank (managers and non-managers)	Age (cohorts), gender, married, #children, #children under six, firm tenure, total work exp., sum of job changes, firm size (categories), Stockholm, PhD, year, occupation, industry
Study 3	1. Wage in employment post re-entry into wage employment	Duration in entrepreneurship (#of years), #spells in entrepreneurship	Age, gender, married, #children, #children under six, capital income, sector, sum of job changes, firm size, firm age, PhD, Stockholm, year, occupation, industry
Study 4	1. Wage in employment post re-entry into wage employment	Firm size (categories), Firm age (categories), Firm layers and rank - prior (post) to entry (re-entry) into entrepreneurship (wage employment)	Age, gender, married, #children, #children under six, capital income, sector sum of job changes, PhD, Stockholm, year, occupation, industry

**Table 3.2**  
SCB Description of the variables

Dataset description				
Long format merged firm and individual panel dataset from 1990-2008				
Variable	Definition	Years	Data source/ Variable(s) name	Description
<b>Key Variables</b>				
Entrepreneurship	1 if the employee ventures from wage employment to incorporated entrepreneurship from t to t+1. 0 otherwise	2002-2008	YrkStalln = "5"	Employment status
Job Switch	1 if the employee moves into a new firm from t to t+1. 0 otherwise	2002-2008	YrkStalln = "2"	Employment status
Firm Size	Number of employees at the firm level.	1990-2008	Org_AntalSys	Employee count at organizational level
Firm Age	Category variable of number of years firm exists from 1990. Categorized into <3, 3-10, >3	1990-2008	Year, LopNr_PeOrgNr	Based on first year firm exists in dataset
Firm Layers	Number of ranks in organization	2002-2008	Ssyk3	Number of layers based on the number of ranks in the focal firm
Employment wage	Employment earnings	1990-2008	LoneInk	Main source of income from wage employment
Entrepreneurial Income	Earnings from entrepreneurship	1990-2008	LoneInk	Main source of income from entrepreneurship
Education	Highest level of education	1990-2008	SUN/SUN2000	education variable
Organizational identifier	Firm level identifier used to link individuals to firms	1990-2008	LopNr_PeOrgNr	Organizational code
STLF	Educated in engineering, natural sciences, or medicine	1990-2008	SUN/SUN2000	education variable
Rank (Managers vs Non-managers)	Rank of the employee in the focal organization	2002-2008	Ssyk3	Ranks based on occupational codes
<b>Control variables - Individual level</b>				
Age	Individual age	1990-2008	Alder	Age
Gender	Individual gender. Male = 1, Female = 0	1990-2008	Kon	gender variable
Firm Tenure	Number of years in the same firm	1990-2008	LopNr_PeOrgNr	Organizational identifier
No of children	Number of dependent children	1990-2008	barn	Children with ages
Civil Status	Individual's civil status. Married=0, Others=1	1990-2008	Civil	Civil status
Scientist/Technologist/Engineer/Mathematics	Individuals specific qualification	1990-2008	SUN/SUN2000	Educational code
Sum of job changes	Job changes in employment history	1990-2008	LopNr_PeOrgNr	Organizational identifier
Government employee	If the individual works for a government firm	1990-2008	Sektorkod	Sector category



Civil Status	Individual's civil status. Married=0, Others=1	1990-2008	Civil	Civil status
Children under 6	Number of dependent children under six years of age	1990-2008	barn	#Children under 6 years of age
Occupation	Occupation code	2002-2008	SsyK3	Occupation of the focal employee
Firm Shutdown	Firm ceases to exist over the following year from t to t+1	1990-2008	LopNr_PeOrgNr/Y ear	
Industry affiliation	Industry code	1990-2008	sni (2 digit)	Industry of the focal employee

## STLF Labor Market in Sweden

The underlying sample for this research is the science and technology workforce (STLF) in Sweden. The basis of identifying the STLF is grounded on the science, technology, engineering or mathematics educational qualifications of the individuals.

The SCB provides educational codes (*SUN* and *SUN2000*) that make it possible to filter individuals based on their educational qualifications and levels. More specifically, the codes make it possible to filter engineers and scientists based on, for example, post graduate degree or doctoral degree. Such a facility enables additional analysis, for example, one that looks exclusively at only engineers, scientists or STEM PhDs.

Besides identifying the STLF based on the educational codes, the availability of the information in the data sets from 1990 to 2008 enables the construction of panel data for the available years. The resulting data structure is a linked employer-employee dataset that is analyzed using various commands provided by Stata 15.

To examine the entrepreneurial careers of the scientists and engineers, the primary idea is to follow the labor force from wage employment and then track their entry into incorporated entrepreneurship or a job switch and subsequently examine the returns from entrepreneurship for those who re-enter paid employment.

I borrow inspiration from Greve (2017) to provide the reader with a descriptive overview of the STLF labor market in Sweden. Table 3.3 presents the mean values for STLF individuals in the period 2002-2008 divided into (1) employees who remained in their current employment (2) transitions into incorporated entrepreneurship, (3) transitions into a job switch, and (4) transitions into mere self-employment. To provide a comparative analysis, I compare the STLF employees with non-STLF employees (others).

For the period 2002-2008, I observe that a significant proportion of STLF employees (84%) remained in the same job, while 1% transitioned into incorporated entrepreneurship, 15% switched jobs, and 0.46% transitioned into self-employment (non-incorporated). Among STLF employees, I observe that scientists and engineers account for a significant share of the transitions into incorporated entrepreneurship (0.77%). I also observe that the average age of the STLF employees who venture into incorporated entrepreneurship is 40 years and a significant proportion (approx. 50%) belong to the 30-40 year age group, while 0.94% are employed in the private sector. Additionally, the mean wage of STLF employees who transition into incorporated entrepreneurship is 478,600 SEK per year and among the STLF, engineers (494,200 SEK/year) and scientists (492,200 SEK/year) earn above the mean wage of the STLF employees who transition into incorporated entrepreneurship. This observation on STLF employees in this sample also differs from entrepreneurship studies that investigate generic samples. For example, Andersson Joona and Wadensjö (2013) suggest a mean annual income of 315,414 SEK for a sample of Swedish born male wage-earners in 2001. In another study, Waldenström (2008) reports an average median labor income of 211,636 SEK for 2006.

For the same period, I observe that a significant share of non-STLF (others) employees (84%) remained in the same job, 0.47% transitioned into incorporated entrepreneurship, 15% switched jobs and 0.56% transitioned into self-employment. I also observe that the average age of non-STLF employees who venture into incorporated entrepreneurship is approximately 38 years, 0.43% are employed in the private sector, and have a mean wage of 338,900 SEK per year.

In summary, comparing the means of STLF and non-STLF employees, I observe differences in variables such as mean wage, employment share in the private sector, and the percentage transitions into non-incorporated and incorporated entrepreneurship. STLF employees are likely to have a higher mean wage compared to non-STLF employees, and also have a higher share of employment in the private sector. Additionally, I observe that a larger proportion (1%) of STLF employees transition into incorporated entrepreneurship compared to 0.47% transitions by non-STLF employees. This indicates the STLF employees are more likely to venture into incorporated entrepreneurship compared to non-STLF employees.

Table 3.4 presents the entry and re-entry data for STLF and non-STLF employees. For entry into entrepreneurship, I observe that relative to non-STLF employees, STLF employees have a higher income in the first year of entrepreneurship, have higher wages in the last year of their wage employment, have higher wages in larger firms (500+ employees), and are more likely to be from Stockholm County. Similarly, for re-entry into wage employment, I observe that compared to non-STLF employees, STLF employees have a higher income in the last year of entrepreneurship and earn more on re-entry into wage employment.

**Table 3.3**

Mean values of the sample 2002-2008 (STLF and Others)

Covariates measured 2002-2008	Remained in current firm		Incorporated Entrepreneurship		Job Switch		Self- Employment	
	STLF	Others	STLF	Others	STLF	Others	STLF	Others
<b>Employment Status Share (%)</b>	<b>83,90</b>	<b>84.04</b>	<b>1,00</b>	<b>0.47</b>	<b>15,10</b>	<b>15.47</b>	<b>0,46</b>	<b>0.56</b>
Scientists (%)	17,33		0,22		2,76		0,10	
Technologists (%)	12,08		0,19		2,73		0,07	
Engineers (%)	47,39		0,55		8,53		0,26	
Mathematicians (%)	7,09		0,05		1,09		0,04	
Female (%)	24,62	38,74	0,18	0,11	4,26	6,81	0,10	0,19
Male (%)	59,27	45,30	0,82	0,36	10,84	8,66	0,35	0,37
Age (mean)	39,09	37.85	40,26	38.79	37,08	35.01	39,87	36.84
16-30 (%)	12,71	22.79	0.12	8.38	3,40	5.81	0,06	0.15
31-40 (%)	37,92	28.71	0.42	19.70	7,08	5.25	0,19	0.23
41-50 (%)	23,56	21.61	0.32	14.24	3,57	3.25	0,15	0.13
51+ (%)	9,70	10.92	0.14	5.03	1,06	1.16	0,06	0.05
Private Sector (%)	57,44	49.70	0,94	0,43	11,71	10.95	0,35	0.38
Others (%)	26,46	34.84	0,06	0,03	3,39	4.52	0,12	0.18
Wage (,00 SEK)	4375	2437	4786	3389	4315	2431	3932	2145
(Std. Dev)	(3135)	(1950)	(3137)	(2682)	(3282)	(1974)	(2737)	(1705)
Scientists	4203		4922		4133		4108	
	(2661)		(2721)		(2765)		(3209)	
Technologists	3961		4321		3868		3827	
	(2240)		(2002)		(3496)		(2087)	
Engineers	4653		4942		4595		4006	
	(3525)		(3587)		(3438)		(2716)	
Mathematicians	3646		4243		3701		3190	
	(2449)		(2835)		(2308)		(2491)	

**Table 3.4**  
Entry and Re-entry Data (STLF & Others)

Entry	STLF	Others	Re-entry	STLF	Others
Total number of entries	2,736	17,765	Total number of re-entries	1,092	6,818
Age (mean)	40.25	38.76	Age (mean)	40.83	40.13
Capital income (mean)**	481	246	Capital income (mean)	1157	1226
1st year ETP income (mean)	4362	3299	Last ETP income (mean)	4663	3404
Last wage (mean)	4786	3390	First year wage income (mean)	4938	3613
Mean last year wage in firms (<=10)	4259	3013	Mean first year wage in firms (<=10)	4489	3277
Mean last year wage in firms (11-50)	5119	3772	Mean first year wage in firms (11-50)	5060	3888
Mean last year wage in firms (51-500)	5196	4719	Mean first year wage in firms (51-500)	5506	4694
Mean last year wage in firms (501+)	5722	3561	Mean first year wage in firms (501+)	5371	3203
#Children (mean)	1.17	1.13	#Children (mean)	1.27	1.23
County (Stockholm)	24.92%	16.66	County (Stockholm)	25.64	18.92
County (Göteborg/Gothenburg)	7.41%	4.64	County (Göteborg/Gothenburg)	6.59	4.00
County (Uppsala)	4.12	1.99	County (Uppsala)	4.76	2.06
County (others)	63.52%	76.69	County (others)	63.00	75.00

\*ETP – Entrepreneurship; Income values are represented in ,00 SEK; \*\* a relatively low capital income at entry is likely due to individuals having a negative capital income at the time of entryln

Table 3.5 (a, b) and Table 3.6 (a, b) I follow Andersson Joona and Wadensjö (2013) to provide an understanding of the industry and occupation affiliation of STLF and non-STLF employees who enter incorporated entrepreneurship from wage employment. In Table 3.5 (a), I observe that a significant proportion of STLF employees (65%) are likely to be from industries associated with professional, scientific, and technical activities prior to entry into entrepreneurship. In Table 3.5 (b) I observe that for non-STLF employees, approximately 36% are associated with real estate, renting and business activities. This suggests that STLF employees, possibly due to their similar educational backgrounds, have a significant employment share in certain industries prior to entry into entrepreneurship. However, I observe that both STLF and non-STLF employees are more likely to associate themselves with the same industry in entrepreneurship as they were involved with in wage employment prior to entry.

I have similar observations on data on occupations from Table 3.6 (a, b). Relative to non-STLF employees, STLF employees are significantly represented (27%) in one occupation (computing professionals) prior to entry into entrepreneurship. However, I observe that both STLF and non-STLF are more likely to associate themselves with the same occupations in entrepreneurship as in wage employment prior to entry.

**Table 3.5 (a)**

Industries on Entry 2002-2008 (STLF) – 2 digit level

Top 6 Industries in wage employment prior to entry into entrepreneurship		Top 6 Industries in entrepreneurship after entry from wage employment	
Industry	(%)	Industry	(%)
Professional, scientific, and technical activities	65.17	Professional, scientific, and technical activities	70.14
Education	13.89	Education	14.29
Transportation & Storage	7.09	Transportation & Storage	7.02
Manufacturing	5.77	Manufacturing	3.69
Finance	1.57	Construction	1.24
Others	6.47	Others	3.62

**Table 3.5 (b)**

Industries on Entry 2002-2008 (Others) – 2 digit level

Top 6 Industries in wage employment prior to entry into entrepreneurship		Top 6 Industries in entrepreneurship after entry from wage employment	
Industry	(%)	Industry	(%)
Real estate, renting and business activities	35.69	Real estate, renting and business activities	38.52
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	20.52	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	20.72
Construction	9.36	Construction	10.00
Manufacturing	8.86	Manufacturing	7.81
Transport, storage and communication	5.60	Hotels and restaurants	5.42
Others	19.94	Others	17.51

**Table 3.6 (a)**  
Occupations on Entry 2002-2008 (STLF) (3 digit)

Top 6 Occupations in wage employment prior to entry into entrepreneurship		Top 6 Occupations in entrepreneurship after entry from wage employment	
Occupations	(%)	Occupations	(%)
Computing professionals	27.56	Computing professionals	28.18
Architects, engineers, and related professionals	15.86	Architects, engineers, and related professionals	15.94
Health professionals (except nursing)	14.55	Health professionals (except nursing)	14.55
Managers of Small Enterprises	6.29	Managers of Small Enterprises	8.48
Business professionals	5.92	Business professionals	6.51
Others	27.12	Others	24.63

**Table 3.6 (b)**  
Occupations on Entry 2002-2008 (Others) (3 digit)

Top 6 Occupations in wage employment prior to entry into entrepreneurship		Top 6 Occupations in entrepreneurship after entry from wage employment	
Occupations	(%)	Occupations	(%)
Managers of Small Enterprises	12.31	Managers of Small Enterprises	15.36
Finance & Sales Associate Professionals	9.78	Finance & Sales Associate Professionals	9.01
Computing Professionals	7.12	Business Professionals	7.80
Business Professionals	7.08	Computing Professionals	7.07
Shops & Stall Salespersons and demonstrators	5.51	Shops & Stall Salespersons and demonstrators	5.42
Others	57.74	Others	54.96

In Table 3.7 (a, b) and Table 3.8 (a, b), I provide an understanding of the industry and occupation affiliation of STLF and non-STLF employees who re-enter wage employment after a spell in entrepreneurship. In general, I observe that STLF employees have a significant employment share in a particular industry (74% - Professional, scientific, and technical activities) and occupation (30% - computing professionals) prior to re-entry into wage employment. However, I observe that both STLF and non-STLF are more likely to associate themselves with the same industries and occupations in wage employment as in entrepreneurship.

**Table 3.7 (a)**  
Industries on Re-entry 2003-2008 (STLF)

Top 6 Industries in entrepreneurship prior to re-entry into wage employment		Top 6 Industries in wage employment after entrepreneurship	
Industry	(%)	Industry	(%)
Professional, scientific, and technical activities	73.90	Professional, scientific, and technical activities	66.12
Education	10.99	Education	11.36
Transportation & Storage	5.68	Manufacturing	7.69
Manufacturing	4.49	Transportation & Storage	6.14
Wholesale & Retail Trade	1.10	Finance	1.83
Others	3.85	Others	6.87

**Table 3.7 (b)**  
Industries on Re-entry 2003-2008 (Others)

Top 6 Industries in entrepreneurship prior to re-entry into wage employment		Top 6 Industries in wage employment after entrepreneurship	
Industry	(%)	Industry	(%)
Professional, scientific, and technical activities	73.90	Professional, scientific, and technical activities	66.12
Education	10.99	Education	11.36
Transportation & Storage	5.68	Manufacturing	7.69
Manufacturing	4.49	Transportation & Storage	6.14
Wholesale & Retail Trade	1.10	Finance	1.83
Others	3.85	Others	6.87

**Table 3.8 (a)**  
Occupations on Re-entry 2003-2008 (STLF)

Top 6 Occupations (2002-2008) in entrepreneurship prior to re-entry into wage employment		Top 6 Occupations (2002-2008) in wage employment after entrepreneurship	
Occupation	(%)	Occupations	(%)
Computing professionals	30.31	Computing professionals	30.59
Architects, engineers, and related professionals	15.29	Architects, engineers, and related professionals	14.65
Health professionals (except nursing)	11.26	Health professionals (except nursing)	11.90
Managers of Small Enterprises	9.89	Managers of Small Enterprises	8.42
Business professionals	6.41	Directors & Chief Executives	5.40
Others	25.18	Others	28.39

**Table 3.8 (b)**  
Occupations on Re-entry 2003-2008 (Others)

Top 6 Occupations (2002-2008) in entrepreneurship prior to re-entry into wage employment		Top 6 Occupations (2002-2008) in wage employment after entrepreneurship	
Occupation	(%)	Occupations	(%)
Managers of Small Enterprises	16.04	Managers of Small Enterprises	14.41
Finance and Sales Associate Professionals	8.78	Finance and Sales Associate Professionals	9.18
Business Professionals	8.66	Business Professionals	8.51
Computing Professionals	8.26	Computing Professionals	8.09
Shops & Stall Salespersons and demonstrators	5.37	Shops & Stall Salespersons and demonstrators	5.07
Others	52.56	Others	54.46

In summary, I observe differences between STLF and non-STLF employees. In particular, I observe that, relative to non-STLF employees, STLF employees are likely to have higher wages in the last year of wage employment prior to entry into entrepreneurship, have a larger concentration of employment within a particular industry and occupation, have higher income in the first year of entrepreneurship, and are also likely to have higher wages on re-entry into paid employment. The literature suggests that with increasing returns to education (Aghion, 2002; Mouw & Kalleberg, 2010) highly educated employees from the STLF are likely to have higher wages. They are also likely to have higher human capital (Becker, 1964) that makes them attractive in the labor market, thus enabling them to obtain higher rewards for their human capital from their entrepreneurial experience. Additionally, being educated in the field of science and technology, they are also likely to be associated with high-skill occupations such as computing (Green, Felstead, & Gallie, 2003).





## 4. Extended Summaries

This dissertation is divided into four studies investigating the overarching research question. Each study zooms in on a specific part of the research question to provide an understanding of a career in entrepreneurship among the STLTF in Sweden. Each study applies different theories to arrive at the hypotheses and a different research design to examine the hypotheses. Table 4.1 provides the summary of the four studies. Briefly, Study 1 and Study 2 examine the antecedents to entry into entrepreneurship by investigating how organizational bureaucracy and income inequality identified by relative income influence entry into entrepreneurship compared to a job switch. The hypotheses are tested using multinomial logistic regression as the analytical method by examining employees with a new job in 2001 and tracking their subsequent transitions into entrepreneurship and a new job from 2002 to 2008. Study 3 and Study 4 examine the career outcome of entrepreneurship by exploring the returns from entrepreneurship of entrepreneurs who re-enter paid employment post entrepreneurship. Studies 3 and 4 follow existing entrepreneurship research in the use of the Entropy Balanced (EB) Matching (e.g. Merida & Rocha, 2018) technique to compare the wages of ex-entrepreneurs who re-enter paid employment and those of similar employees (based on observational characteristics) who do not experience entrepreneurship.

### **Study 1 – “Bureaucracy and Mobility into Entrepreneurship among the Science and Technology Labor Force (STLTF) in Sweden”**

This study examines how an important organizational characteristic – bureaucracy (Weber, 1924) – influences an employee’s career mobility (Rider et al., 2019) into entrepreneurship versus a job switch. Additionally, the study investigates how both the division of labor and the availability of career options within the organizations influences initial performance - entry size in entrepreneurship.

#### *Theory*

This study zooms in on two elements of bureaucracy – the formal division of labor and hierarchical authority with a well-defined career path and its influence on employees’ career mobility. First, the formal division of labor (Weber, 1924) in a bureaucracy emphasizes that each member has a specific task to fulfill. Employees are trained to specialize in tasks that are more suited to the idiosyncratic production process of a particular firm. Such employees develop more specialized skills than

generic skills, limiting mobility, but more for entrepreneurship than a job switch. And second, bureaucracies offer an internal labor market (Doeringer & Piore, 1985) with job ladders that allow opportunities for career advancement through promotion from lower ranks (non-managers) to higher ranks (managers). However, the hierarchical structure (Weber, 1922, 1924) limits career advancement as one moves up the career ladder, making employees seek career advancement opportunities outside the organization, either through entrepreneurship or a job switch. Additionally, with increasing bureaucracy, employees are likely to be endowed with higher financial resources, as well as relatively higher human capital (Kalleberg & Van Buren, 1996) and social capital (Leana III & Van Buren, 1999) that are likely to attract future colleagues, thereby influencing initial performance - the entry size in entrepreneurship.

### *Data & Methods*

I built a sample of STLTF (graduates and above) employees in Sweden with new jobs in 2001 and followed them from 2002-2008. I used previous entrepreneurship studies (Sørensen, 2007; Tåg et al., 2016) to identify proxies for bureaucracy measured using firm size, firm age, and firm layers. Organizational rank is identified using occupational codes provided by Statistics Sweden (SCB). Multinomial logistic regression is used to identify the effect of bureaucracy on mobility into entrepreneurship versus a job switch. Additionally, negative binomial (NB) regression is employed to capture the effect of bureaucracy on the entry size in entrepreneurship. Furthermore, I provide an understanding of the returns from entrepreneurship for scientists, technologists, engineers, mathematicians, and STLTF PhD holders. All the main models are executed using controls at individual, firm, and industry level. In addition to the main analysis, robustness checks are performed to control for self-selection effects using fixed effects methods and the Entropy Balanced (EB) matching algorithm.

### *Findings*

The study revealed a reduction in mobility with increasing bureaucracy, more for entrepreneurship than a job switch. The result is consistent across all three measures of bureaucracy. However, there is no evidence to support the career advancement argument for mobility into entrepreneurship versus a job switch based on organizational ranks (managers versus non-managers) contingent on any of the three measures of bureaucracy. On studying entry size in entrepreneurship, the results indicate that entry size increases with firm size and firm layers.

### **Study 2 – “Relative Income, Mobility, and Returns from entrepreneurship among the Science and Technology Labor Force (STLF) in Sweden”**

This study investigates another important organizational characteristic – income inequality identified by relative income – on mobility into entrepreneurship versus a job switch, and how this relationship is moderated by an employee’s

organizational rank (managers versus non-managers). Additionally, the study examines how an employee's relative income influences the initial performance in entrepreneurship – initial income and entry

### *Theory*

This study uses social comparison theory (Festinger, 1954; Suls & Wheeler, 2000) to provide a theoretical understanding of the mechanisms that influence the career mobility of employees. Social comparison theory suggests that individuals are likely to compare themselves to similar others using important dimensions such as income. Relative income can be a great motivator, can fuel ambition and bolster achievement (Isenberg, 2014) or can trigger a feeling of distributive injustice or relative deprivation (Stark & Hyll, 2011; Zenger, 1994) depending on an employee's position in the income distribution, thereby influencing his/her mobility decisions, either into entrepreneurship or a job switch. Additionally, the division of labor (Weber, 1924) endows employees with skills and knowledge contingent on their rank (managers versus non-managers), moderating the relationship between an employee's relative income and his/her career mobility. An employee's relative position in the income distribution is also likely to provide differential access to resources and opportunities that might influence their initial performance – initial income in entrepreneurship and entry size in entrepreneurship.

### *Data & Methods*

I used a matched employee-employer dataset to test the hypotheses on a sample of STLF employees (graduates and above) in Sweden with new jobs in 2001 and followed them from 2002-2008. The key dependent variables are mobility – identified as 1 for mobility into entrepreneurship and 2 for a job switch, returns from entrepreneurship – measured using initial income in entrepreneurship, and entry size – measured using the size of the firm in the first year of entrepreneurship (Agarwal & Audretsch, 2001). The key independent variables are relative income - measured using a residual form of income regression (Andersson Joona & Wadensjö, 2013) and organizational rank (Tåg et al., 2016) – measured using occupational codes provided by Statistics Sweden (SCB). Multinomial logistic regression is used identify the effect of relative income on mobility into entrepreneurship versus a job switch. Additionally, OLS and negative binomial (NB) regression are used to capture the effect of relative income on initial income and entry size in entrepreneurship. All three main models are evaluated using controls at individual, organizational, and industry level. In addition to the main analysis, robustness checks are performed to control for self-selection effects using the Entropy Balanced (EB) matching algorithm.

## *Findings*

The results indicate that employees with a lower relative income, compared to those with a higher relative income, are more likely to transition into entrepreneurship compared to a job switch. However, the results do not provide support for the moderating effect of an employee's rank in the organization on the relationship between relative income and mobility. Additionally, the results indicate that employees with a lower relative income demonstrate a lower entry size and lower initial returns on entry into entrepreneurship relative to employees with a higher relative income.

### **Study 3 – “Time Well Spent? The Effects of Duration and Number of Spells in Entrepreneurship on Returns from Entrepreneurship among the Science and Technology Labor Force (STLF) in Sweden”**

This study broadens our understating of an employee's decision to venture into entrepreneurship by investigating the returns from entrepreneurship for entrepreneurs who re-enter wage employment post experience in entrepreneurship. More specifically, the study examines how the duration and number of spells in entrepreneurship influence the re-entry wages of entrepreneurs relative to matched employees with no experience of entrepreneurship.

## *Theory*

The study uses human capital theory to argue how entrepreneurs develop or hinder skills based on the duration and number of spells in entrepreneurship that is likely to influence their wages in subsequent paid employment. Human capital theory (Becker, 1964; Lazear, 2009) suggests that wages are influenced by the human capital of the individual. Experience in entrepreneurship endows entrepreneurs with generic skills and knowledge, e.g. broad management skills, willingness to perform, and self-direction (Douglas & Shepherd, 2000; Lazear, 2004). With a longer time spent in entrepreneurship they develop a better match to entrepreneurship and gain human capital that differs from the initial human capital (Flinn, 1986; Yang & Aldrich, 2017). However, interruptions in work depreciate the human capital stock of the individual (Mincer & Ofek, 1982). With each new spell, entrepreneurs develop “newer” human capital that differs from the previous spell. Therefore, both the time spent in entrepreneurship and the number of spells in entrepreneurship influence their human capital, thereby affecting their wages on re-entry into paid employment.

## *Data & Methods*

I used matched employee-employer register data to study a sample of STLF from Statistics Sweden for 1990-2008. I then sampled STLF employees with new jobs in 1991 and tracked their labor market transitions into incorporated entrepreneurship (Levine & Rubinstein, 2017) after three years in wage employment and then back

into paid employment. I followed Kaiser and Malchow-Møller (2011) and built a treatment group for each of the categories for the number of years in entrepreneurship and the number of spells in entrepreneurship. I then used the Entropy Balanced (EB) matching algorithm (Hainmueller, 2012) to estimate the treatment effect of the number of years and the number of spells in entrepreneurship on the wages of ex-entrepreneurs by comparing them with the control group – matched workers with no experience of entrepreneurship.

### *Findings*

The findings of the study suggest that ex-entrepreneurs who spend more than three years in entrepreneurship are likely to increase their wages by 34% on re-entry into paid employment, compared to their matched counterparts in paid employment. However, ex-entrepreneurs with more than two spells in entrepreneurship are likely to reduce their wages by 17% compared to their matched counterparts, suggesting negative returns with greater number of spells in entrepreneurship for entrepreneurs who re-enter paid employment after experience in entrepreneurship.

#### **Study 4 – “Bureaucracy and Returns from Entrepreneurship among the Science & Technology Labor Force (STLF) in Sweden”**

This study extends Study 3 by examining how the bureaucratic nature of the employer – both prior to entry into entrepreneurship and on re-entry into paid employment – is likely to confound the human capital of ex-entrepreneurs, thereby influencing their wages on re-entry into paid employment compared to employees with no entrepreneurship experience. Additionally, this study investigates how wages of ex-entrepreneurs are likely to differ based on their organizational rank (managers versus non-managers) prior to entry into entrepreneurship and organizational rank on re-entry into paid employment.

### *Theory*

I built on the division of labor (Weber, 1922) to propose two key arguments. First, I argue that the wages of ex-entrepreneurs re-entering paid employment are likely to be influenced by the bureaucratic nature of the employer at re-entry. There exists heterogeneity among firms, and larger firms, which in general are more bureaucratic than smaller firms, have different skill requirements that are likely to influence employee productivity (Even & Macpherson, 2012; Kalleberg & Van Buren, 1996). More bureaucratic firms characterized by detailed division of labor expect employees to be more specialized in their skills, while less bureaucratic firms require employees to have more generic skills (Sørensen, 2007). As entrepreneurship endows individuals with skills that are more generic in nature (Lazear, 2004), wages on re-entry into paid employment are likely to be contingent on the bureaucratic nature of the employer. Ex-entrepreneurs are more likely to be more productive in less bureaucratic firms, thereby influencing their wages. Second, I argue that the wages of entrepreneurs re-entering paid employment are likely to

be contingent on the bureaucratic nature of the employer prior to entry into entrepreneurship. The literature suggests that employees in the generally less bureaucratic smaller firms develop skills and knowledge well-suited for entrepreneurship, contrary to the skills developed by employees in more bureaucratic firms (Kacperczyk, 2012; Sørensen, 2007; Tåg et al., 2016). Entrepreneurs employed in smaller, less bureaucratic firms prior to entry into entrepreneurship are likely to be better matched (Jovanovic, 1979) to entrepreneurship than those from larger, more bureaucratic firms. Entrepreneurs from less bureaucratic firms are also likely to be more productive and to appreciate the skills gained from their experience in entrepreneurship. As skills are an important determinant of wages on re-entry into wage employment, the wages are likely to be influenced by the bureaucratic nature of the employer prior to entry into entrepreneurship. Additionally, the division of labor (Weber, 1922) classifies employees based on their organizational rank (managers versus non-managers) (Blau & Schoenherr, 1971). Managers are likely to have more generic skills, while non-managers (e.g. production workers) are likely to have more specialized skills. This suggests that on re-entry into paid employment, entrepreneurs employed as managers are likely to be better matched (Jovanovic, 1979) to their jobs than non-managers. Similarly, the organizational rank of the entrepreneur prior to entry into entrepreneurship is likely to either appreciate or deprecate his/her skills from the entrepreneurial experience that in turn will probably affect the wages on re-entry into paid employment. This suggests that on re-entry into paid employment, the wages of entrepreneurs are likely to depend on the organizational rank prior to entry into entrepreneurship and the organizational rank on re-entry into paid employment.

### *Data & Methods*

I used a matched employee-employer dataset to test the hypotheses on a sample of STLF employees in Sweden with new jobs in 2001 and followed them from 2002-2008. I employed a design similar to Study 3 where I built treatment groups based on proxies for bureaucracy – firm size, firm age, and firm layers (Sørensen, 2007; Tåg et al., 2016), prior to entry into entrepreneurship and re-entry into entrepreneurship. Similarly, I built treatment groups for organizational rank (managers and non-managers). I then used the Entropy Balanced (EB) matching algorithm to estimate the treatment effect of each measure of bureaucracy and organizational rank – prior to entry into entrepreneurship and on-re-entry into paid employment on the wages of ex-entrepreneurs by comparing them with the control group – matched workers with no entrepreneurship experience.

### *Findings*

The results of this study indicate that on re-entry, ex-entrepreneurs have negative wages (-0.06;  $p < 0.05$ ) in very small firms (less than or equal to 10 employees) compared to matched employees, increasing to positive (10;  $p < 0.001$ ) in medium sized firms (51-500 employees) while reducing again (0.06;  $p < 0.05$ ) (but still

positive) in large firms (501+ employees), suggesting an inverted U-shaped relationship between re-entry firm size and returns from entrepreneurship. The results also suggest that being employed as a manager prior to entry into entrepreneurship and being employed as a manager on re-entry leads to positive returns from entrepreneurship relative to matched employees who have no experience of entrepreneurship.

**Table 4.1**

Summary of the four studies

	<b>Theoretical perspectives</b>	<b>Sample</b>	<b>Methods</b>	<b>Findings</b>
Study 1	Division of labor (Weber, 1922)	STLF (graduates and above) wage earners with new jobs in 2001 and followed until 2008 (33,617 individuals).	Multinomial logistic regression, Negative Binomial regression	Mobility decreases with increasing bureaucracy, being especially pronounced for entry into entrepreneurship compared to a job switch. However, there are no effects of bureaucracy for employees on the basis of their organizational ranks (managers versus non-managers) on entry into entrepreneurship, compared to a job switch. Among those who enter entrepreneurship, average entry size is larger for those who were employed in larger firms and firms with more layers.
Study 2	Social comparison theory (Festinger, 1954)	STLF (graduates and above) wage earners with new jobs in 2001 and followed until 2008 (33,617 individuals)	Multinomial logistic regression, Negative Binomial regression, OLS regression	Employees with a lower relative income, than those with higher relative income are more likely to transition into entrepreneurship than switch jobs. There is no support for the relationship between relative income and mobility being moderated by an employee's rank in the organization. Additionally, employees with a lower relative income demonstrate lower entry size and lower initial returns on entry into entrepreneurship.
Study 3	Human capital theory (Becker, 1964)	STLF entrepreneurs and matched employees with no entrepreneurial experience (8,050 individuals).	Entropy Balanced (EB) matching, OLS	Entrepreneurs who spend a longer time in entrepreneurship develop and hone entrepreneurship skills that are valued by future employers. However, entrepreneurs with more spells in entrepreneurship are unlikely to spend consistent time in entrepreneurship to develop entrepreneurship skills that are valued by future employers. This suggests that a longer duration and a greater number of spells in entrepreneurship are different facets of an entrepreneurial career that have distinct effects on the returns from entrepreneurship.
Study 4	Division of labor (Weber, 1922)	STLF entrepreneurs and matched employees with no entrepreneurial experience (34,668 individuals)		On re-entry into paid employment, ex-entrepreneurs, relative to wage employees with similar observational characteristics, earn lower wages in very small firms, but relatively higher wages in medium-sized and larger firms. Additionally, entrepreneurs who were employed as non-managers prior to entry and/or who are employed as non-managers on re-entry into paid employment, earn lower wages relative to similar employees without entrepreneurial experience, but managers seem to benefit more in terms of higher wages after post entrepreneurial experience.





## 5. Conclusions

Research suggests that careers are important in an individual's life. In recent times, although there has been a shift from a traditional organizational career characterized by promotions and salary increases, to a modern career that spans organizational boundaries, organizational careers still remain a desirable career option. Movement from organizations to entrepreneurship and back into organizations is remarkably common, thus suggesting that entrepreneurship represents an attractive career option compared to paid employment. Understanding entrepreneurship as a career is thus central to entrepreneurship scholars. In this context, although it has been noted how organizations influence an employee's career mobility into entrepreneurship and the career outcome by investigating the returns from entrepreneurship, research has largely been disjointed due to focusing on either the entry into entrepreneurship and initial returns from entrepreneurship or on the returns from entrepreneurship post entrepreneurial experience. There exists a gap in the research that is intended to provide a comprehensive understanding of entrepreneurship as a career. In this dissertation, I adopted a career perspective on entrepreneurship by drawing on a sample of highly educated employees from the STLF and using incorporated entrepreneurship as a proxy for entrepreneurship to study the mechanisms of how organizations influence the career choice of entrepreneurship compared to a job switch (Study 1 and Study 2) and the career outcome in terms of returns from entrepreneurship post re-entry into paid employment (Study 3 and Study 4). A significant share of entrepreneurs have careers in organizations prior to entry into entrepreneurship and a significant number of those move back into paid employment post a career in entrepreneurship.

With respect to Study 1 and Study 2, this research indicated that entrepreneurship still does not represent an attractive career alternative for employees from bureaucracies, a finding supported by related studies in entrepreneurship (e.g. Sørensen, 2007; Tåg et al., 2016). Bureaucracies are likely to be seen as attractive employers that provide higher wages and internal career advancement opportunities, making STLF employees prefer paid employment over a career in entrepreneurship. The division of labor in bureaucracies is likely to make employees specialize their skills that are more suited to the firm that possibly provides them with alternative internal mobility options such as intrapreneurship (Kacperczyk, 2012). However, this research found that employees from larger and more hierarchical firms have a larger entry size, suggesting better subsequent performance in entrepreneurship

(Agarwal & Audretsch, 2001). Entrepreneurship research suggests that initial factors such as human capital, financial capital, and initial size predict future performance measures such as growth and survival (Agarwal & Audretsch, 2001; Agarwal et al., 2016; Campbell, Ganco, Franco, & Agarwal, 2011; Cooper, Gimeno-Gascon, & Woo, 1994; Cooper, Woo, & Dunkelberg, 1989; Ganco, 2013). Our result provides indications that although bureaucracies reduce mobility into entrepreneurship, they are likely to produce entrepreneurs of higher quality, a finding in line with previous studies (e.g. Cooper & Bruno, 1977; Hvide, 2009). With a larger initial size, entrepreneurs are likely to develop competitive abilities, greater resources, and superior management (Aldrich & Auster, 1986; Bradley, Aldrich, Shepherd, & Wiklund, 2011). This research also found that driven in part by the process of social comparison, employees with a lower relative income are likely to perceive unfairness and develop upward social comparisons to those with a relatively higher income. Such employees are likely to undertake a risk taking activity such as entrepreneurship. This result, in contrast to a previous study (e.g. Nikolaev & Wood, 2018), suggests that highly educated STLF employees possessing high human capital are likely to view entrepreneurship as a vehicle for income enhancement, thereby not only developing intentions for entrepreneurship (Werner et al., 2014), but also engaging in entrepreneurship instead of a job switch. The findings indicate that our highly educated members of the STLF are likely to use economic logic when choosing between alternative career paths in order to determine an occupation that maximizes the present value of economic benefits over the lifetime (Becker, 1962; Douglas & Shepherd, 2000; Gimeno, Folta, Cooper, & Woo, 1997). However, this research also found that employees with a lower relative income, compared to those with a higher relative income, are likely to possess limited human and financial resources and thus enter entrepreneurship with a smaller entry size and lower initial income.

Study 3 and Study 4 examined the career outcome of entrepreneurship by investigating the returns from entrepreneurship for entrepreneurs who re-enter paid employment post their entrepreneurial experience. Previous studies (e.g. Manso, 2016) indicate that entrepreneurs with longer spells in entrepreneurship earn higher wages than salaried workers. The results of this research reveal that it takes time to develop the entrepreneurial skills considered valuable by the labor market. One interpretation is that over time, entrepreneurs master skills that are likely to be valued in paid employment. Relative to employees who do not have recent entrepreneurship experience, entrepreneurs are likely learn generic skills that are possibly new and differ from the specialized skills in paid employment and also of potential value if they re-enter paid employment, where longer spells in entrepreneurship enable them to obtain higher returns. However, this research found that with a greater number of spells in entrepreneurship, the returns are likely to be lower for ex-entrepreneurs relative to their matched counterparts. This result is similar to Parker (2013), who suggests that the performance curve of serial entrepreneurs over successive ventures involves *positive* returns that depreciate over

time. Although not directly comparable to Parker (2013), the result of this research indicates that more number of spells in entrepreneurship is unlikely to provide sufficient time to learn entrepreneurial skills, thus affecting an ex-entrepreneur's ability to achieve value, not only during entrepreneurship but also beyond the entrepreneurial experience.

Additionally, the results of this research indicate that employers differ based on their bureaucratic characteristics which can have an impact on the reward for ex-entrepreneurs who re-enter paid employment following their entrepreneurial experience. Contrary to the prediction of this research, the results indicate that ex-entrepreneurs who re-enter paid employment in very small firms are likely to be penalized for their entrepreneurial experience, while positively rewarded in large firms. One possible interpretation of this finding is that although ex-entrepreneurs are more likely to find a better match of their skills in very small firms relative to large firms, very small firms are likely to be affected by the liability of smallness (Aldrich & Auster, 1986). Smaller firms are likely to be constrained, for example, in terms of financial (Cardon & Stevens, 2004) resources, thus limiting opportunities to provide firm specific training to ex-entrepreneurs (Mellow, 1982). On the other hand, larger firms have greater financial resources (Brown & Medoff, 1989; Kalleberg & Van Buren, 1996), enabling them to pay higher wages that highlights the value of the skills obtained from entrepreneurship. The results of this research also indicated that ex-entrepreneurs employed in large and more hierarchical firms prior to entry into entrepreneurship benefit in terms of the wages after their entrepreneurial career compared to ex-entrepreneurs employed in smaller and less hierarchical firms. Our results suggest that employers are likely to consider the size of the previous employer as a signal for unobservable employee characteristics (Sørensen & Phillips, 2011). Ex-entrepreneurs employed in large and more hierarchical firms prior to entry into entrepreneurship are likely to convey positive signals to the labor market that enables them to earn higher rewards on re-entry into paid employment. Our findings thus demonstrate how the human capital of the ex-entrepreneur is likely to be confounded by the bureaucratic nature of the employer, both prior to entry into entrepreneurship and on re-entry into paid employment. Furthermore, this research found that employees in managerial ranks, relative to non-managers benefit more in terms of wages in paid employment post entrepreneurial experience. Employees in managerial ranks prior to entry into entrepreneurship are likely to possess more generic skills such as leadership, planning, and organization (Kurke & Aldrich, 1983; Mintzberg, 1973). On entering entrepreneurship, managers are likely to further enhance their generic skills from their entrepreneurial experience, which benefits them in terms of higher wages in paid employment. In a similar vein, ex-entrepreneurs employed as managers on re-entry transfer their generic skills from entrepreneurship, which also benefits them in terms of wages in paid employment.

## Implications for Entrepreneurship Theory

First, as Burton et al. (2016: 237) noted, “there is much more to be learned by conceiving of entrepreneurship not solely as a final destination, but as a step along a career trajectory”. They note that entrepreneurship scholars primarily focus on founding a new venture or transitions into entrepreneurship as an end in itself and further suggest that although studying entry represents an important and fruitful research area that has been the subject of significant contributions from entrepreneurship scholars, such transitions should be understood in the context of a “career” that takes into consideration past states and future trajectories. At the same time, career scholars suggest a “new organizational career” that combines the elements of an internal organizational career and those of the boundaryless career that spans organization and/or occupations (Clarke, 2013). Career scholars have been calling for an interdisciplinary approach that integrates career research with other domains such as entrepreneurship (Akkermans & Kubasch, 2017). By providing evidence of the influence systematic links between organizational bureaucracy and relative income on the career mobility of employees into entrepreneurship compared to a job switch (Study 1 and Study 2) and how entrepreneurs are likely to be rewarded in employment careers post their entrepreneurial experience (Study 3 and Study 4), the present dissertation provides a broad understanding of the antecedents and the consequences of a career in entrepreneurship. This research broadly investigates a “new organizational career” where employees transition from a career in organizations to a career in entrepreneurship and back to a career in organizations (Clarke, 2013). Although studies have investigated how organizations influence the career mobility of employees into entrepreneurship (e.g. Rider et al., 2019; Sørensen & Sharkey, 2014) and how entrepreneurship influences the career outcomes in paid employment (e.g. Kaiser & Malchow-Møller, 2011; Luzzi & Sasson, 2016), research has largely been disjointed and there has been a gap in the research due to the focus on either entry into entrepreneurship or the returns obtained on re-entry into paid employment post a career in entrepreneurship. Although this research is divided into four separate studies, when combined as a dissertation it provides an initial understanding of an entrepreneurial career (e.g. Burton et al., 2016; Carroll & Mosakowski, 1987) in highly educated members of the STLTF that has evoked significant interest in entrepreneurship research (e.g. Braguinsky et al., 2012; Stenard & Sauermann, 2016).

Second, a firm’s size and age are important determinants of an employee’s propensity to venture into entrepreneurship (e.g. Elfenbein et al., 2010; Kacperczyk, 2012; Sørensen, 2007; Tåg et al., 2016). Studies suggest that employees from smaller, younger firms develop skills and knowledge that are suited to entrepreneurship, while larger and older organizations that in general are more bureaucratic equip employees with skills that are less appropriate for

entrepreneurship (Kacperczyk, 2012; Tåg et al., 2016). Sørensen (2007) and Tåg et al. (2016) advance our understanding by providing evidence of how bureaucracy is likely to limit mobility into entrepreneurship. This research, by presenting arguments and empirically testing using three proxies of bureaucracy, showed how a formal division of labor is likely to limit mobility, but more for entrepreneurship than for a job switch. Thus, we advance our understanding of how an important characteristic of bureaucracy plays a crucial role in developing specialized skills, making employees less suited to entrepreneurship. Additionally, previous research in general suggests that entrepreneurs from smaller firms are likely be endowed with knowledge and skills that might make them perform better in entrepreneurship compared to employees from larger firms (Elfenbein et al., 2010; Kacperczyk & Marx, 2016). We contribute to this knowledge by alternatively showing how the division of labor in large and more hierarchical firms is likely to endow employees with financial and human resources that enable them to enter entrepreneurship with a larger entry size, implying entrepreneurs of high quality (Hvide, 2009).

Third, this research adds to the growing interest in examining how income inequality influences the mobility of employees (e.g. Andersson Joona & Wadensjö, 2013; Kacperczyk & Balachandran, 2018; Nikolaev & Wood, 2018). Research has provided evidence of how relative income influences individual behavior and outcomes such as increased risk taking, morale, and job satisfaction, in part due to the social comparison process (Clark et al., 2008; Payne et al., 2017). By using social comparison (Festinger, 1954; Suls & Wheeler, 2000) as the key theoretical framework, we show how employees with a lower relative income are more likely to enter entrepreneurship than switch to a new job, compared to employees with a higher relative income. We thus advance our knowledge on how relative income is likely to influence employees to undertake risk taking activity such as entrepreneurship. We also advance knowledge by providing evidence that employees with a lower relative income are likely to be poorly rewarded on entry into entrepreneurship compared to those with a higher relative income.

And fourth, this research examines the returns from entrepreneurship for ex-entrepreneurs who re-enter paid employment after experience in entrepreneurship. Empirically, I examine this by comparing the wages of ex-entrepreneurs to those of employees with no entrepreneurial experience. Theoretically, using human capital theory and the division of labor to hypothesize how experience in entrepreneurship is likely to influence the wages of ex-entrepreneurs relative to matched employees who do not experience entrepreneurship. By focusing on the various theoretical lenses, I advance existing knowledge (e.g. Bruce & Schuetze, 2004; Daly, 2015; Evans & Leighton, 1989) by providing an understanding of the mechanisms that are likely to influence the returns from entrepreneurship for ex-entrepreneurs contingent on the duration spent in entrepreneurship, the number of spells in entrepreneurship, and the employer bureaucracy – prior to entry into entrepreneurship and on re-entry into paid employment. Overall, this research provides evidence of how an

employee's entrepreneurship experience is likely to be valued by employers in paid employment relative to employees who do not experience entrepreneurship. Through such an examination, the studies also extend existing entrepreneurship research (e.g. Hamilton, 2000; Manso, 2016; Parker, 2013; Toft-Kehler et al., 2014) by investigating the value of entrepreneurial experience relative to paid employment that can extend beyond entrepreneurship.

In summary, this dissertation contributes to the scholarly literature on entrepreneurial careers, entrepreneurial entry, knowledge workers, and returns from entrepreneurship. First, this dissertation zooms in on the mechanisms that affect the careers of knowledge workers from the STLF in their propensity to enter into incorporated entrepreneurship versus a job switch. It further develops our understanding of how a career in entrepreneurship is located versus a job switch, thereby departing from several traditional models that treat entrepreneurship as a specific case of labor market mobility and focus on entry into generic self-employment that is likely to mix the various forms of entrepreneurship (e.g. Lévesque et al., 2002; Stenard & Sauermann, 2016; Sørensen, 2007; Sørensen & Sharkey, 2014; Tåg et al., 2016). Second, by focusing on returns from entrepreneurship, the dissertation advances existing research (e.g. Bruce & Schuetze, 2004; Daly, 2015; Evans & Leighton, 1989; Van Praag & Raknerud, 2017) by studying the various mechanisms that influence the returns from entrepreneurship. And third, by simultaneously investigating entry to and returns from entrepreneurship, it advances our knowledge of how entry into entrepreneurship is a step along the career trajectory (Burton et al., 2016). It therefore departs from traditional models that generally view entry into entrepreneurship as an end in itself, thereby providing a holistic view of entrepreneurship as a career among a well-defined population of knowledge workers from the STLF.

## Limitations and Future Research

This dissertation comprises four studies, each of which contains a reflection on the specific limitations as well as suggestions about avenues for future research. Therefore, I will not discuss those details here, but instead outline four overarching limitations and areas for future research.

First, while examining the relationship between bureaucracy and entrepreneurship (Study 1 and Study 4), I used the division of labor (Weber, 1922) as the core characteristic of bureaucracy. Although this advances our knowledge by deepening our understanding of one element of bureaucracy, future work could possibly look at other elements of bureaucracy and how they could influence employees in their decision to enter entrepreneurship. For example, de Figueiredo, Rawley, and Rider

(2015) suggest that as organizations age, political frictions arise between those who support established routines and those who want to develop new ones. Such political frictions could lead those employees who want to develop new routines to feel pressurized to adhere to the existing rules and routines, thus influencing their behavior in terms of quitting their job.

Additionally, I followed literature (Sørensen, 2007; Tåg et al., 2016) in my decision to use firm size, firm age, and firm layers as proxies to operationalize the division of labor in an organizational bureaucracy. Although such operationalization offers external validity by taking a broad view of bureaucracy, for internal validity one would have to construct a more detailed operationalization of bureaucracy and division of labor to tap into the nuances of what foundational scholars such as Adam Smith (2005) or Max Weber (1946) had to say about the nature of the division of labor in organizations. For example, Adam Smith in his famous book, *The Wealth of the Nations*, describes the division of labor as the basic element for firms to achieve productivity. He states that instead of the pin maker, there had to be someone who made the head, someone who straightened the wire, someone who polished the point, and someone who attached the head to the wire. And crucially, a manager or an entrepreneur needed to oversee this process. Although as individuals they are less skilled than the pin maker, together they produce more and cheaper pins. Future work may possibly look at such nuances of the division of labor to examine its relationship with mobility into entrepreneurship. In line with Smith's description of the manager or the entrepreneur who supervises the pin making process, future work could also examine such individuals in relation to the mobility into and returns from entrepreneurship. The results of this dissertation indicate that managers are likely to behave differently from non-managers, which not only influences their entry into entrepreneurship but also their returns from entrepreneurship.

In addition to the division of labor, researchers (e.g. Adler, 2012; Adler & Borys, 1996; Hall, 1963; Hlavacek & Thompson, 1973; March & Simon, 1993; Thompson, 1965) have used other features of bureaucracy such as workplace formalizations (Adler & Borys, 1996), tight budget control systems, and the hierarchy of authority (Hlavacek & Thompson, 1973) to investigate how organizational bureaucracy influences employee outcomes. For example, Hlavacek and Thompson (1973) conducted in-depth interviews in three of the largest chemical firms in the United States to investigate how tight budget constraints on resources needed for innovation affect product launches by product managers. Future studies could possibly look at such alternative dimensions of bureaucracy and the corresponding means of operationalization to investigate the relationship between bureaucracy and entrepreneurship.

Second, this dissertation focuses on a narrow sample of highly educated STLF individuals. Although a narrow sample is likely to have its advantages as discussed in the earlier chapters, it may also have disadvantages, such as generalizability of



the findings to broad samples, for example a sample of non-STLF individuals in Sweden. The descriptive analyses in chapter 3 provided indicators of how the STLF sample differs from the “others”, at least in the Swedish context. The results from each of the studies in this dissertation should therefore be interpreted keeping in mind the narrow sample of individuals who are likely to be elite individuals with high human and social capital who create high growth firms, and are in a better position than other entrepreneurs to identify and exploit high potential opportunities (Delmar et al., 2011; Eberhart et al., 2017). Focusing on such elite groups is likely to lead to conclusions based on individuals who may not be responsive to the same considerations as the generic population (Elfenbein et al., 2010). Additionally, research suggests that these entrepreneurs are likely to be associated with high technology entrepreneurship (Braguinsky et al., 2012). Welter, Baker, Audretsch, and Gartner (2017) call for entrepreneurship research that embraces a wider, nondiscriminatory perspective and moves away from an excessive focus on technology businesses. Future research could possibly advance our knowledge of the entrepreneurial careers of other entrepreneurs such as social entrepreneurs (e.g. Barinaga, 2017) or refugee entrepreneurs (Wauters, Lambrecht, & research, 2007).

Third, this dissertation focused on incorporated entrepreneurship that represents a narrow definition of self-employment in general. Individuals have an option of entering unincorporated or incorporated entrepreneurship, each of which have different financial and skill requirements, thereby indicating differences in the antecedents to entering into and re-entering paid employment from incorporated entrepreneurship and generic self-employment. Using the U.S Census Bureau of self-employed Americans, Shane (2014) suggests that incorporated entrepreneurs are more likely to be highly educated and to earn far more than the unincorporated self-employed. This indicates that in general, highly educated STLF incorporated entrepreneurs are likely to have higher returns from entrepreneurship. Future research could investigate whether non-STLF individuals who enter unincorporated entrepreneurship and spend a longer period in entrepreneurship earn higher rewards on re-entry into paid employment. Future work could also focus on possibly comparing employees from different industries (e.g. services versus manufacturing) to confirm the findings from this dissertation.

Fourth, this study focused on examining the career outcome of entrepreneurship based on wages during and on re-entry into paid employment. However, the literature suggests that employees enter entrepreneurship for various reasons and not only for the pecuniary benefits of entrepreneurship, thus future research is required to examine the outcome of entrepreneurship on factors such as the need for independence (Benz, 2009), happiness (Andersson, 2008), and achievement (McClelland, 1961). Future work might possibly look at other non-financial factors such as career outcomes of entrepreneurship.

And fifth, this study focused on the labor market in Sweden, which differs, from liberal markets such as the USA or emerging economies such as China and India.

Different local contexts of the labor markets have different requirements in terms of their employees, for that reason it would be interesting to compare the findings of this dissertation with those of studies focusing on other labor markets.



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# Paper I





# Bureaucracy and Mobility into Entrepreneurship among the Science and Technology Labor Force (STLF) in Sweden

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# Abstract

The relationship between bureaucracy and mobility into entrepreneurship has been established in a limited set of papers using generic samples. This paper continues to unpack the effect of bureaucracy by investigating how two finer grained mechanisms in bureaucracies influence mobility into entrepreneurship over a job switch: the formal division of labor leading to the development of specialized human capital, and the increasingly limited possibilities for employees' career advancement. Following 33,617 individuals from the Science and Technology Labor Force in Sweden 1990-2008, our results suggest that labor mobility decreases with increasing bureaucracy, being especially more pronounced for entry into entrepreneurship relative to a job switch, however we find no effects of bureaucracy for employees on the basis of their organizational ranks (managers versus non-managers) on entry into entrepreneurship, over a job switch. Among those that enter entrepreneurship, the average entry size is larger for those that were employed in larger firms and employed in firms with more layers.

**Keywords:** Bureaucracy, mobility, entrepreneurship entry, STLF, Panel Data

## Introduction

Organizational structure, employee mobility and career attainment are important to understanding entry into entrepreneurship (Sørensen & Sharkey, 2014). Organizations and their structures are considered important explanations for an employee's mobility into entrepreneurship (e.g. Dobrev & Barnett, 2005; Kacperczyk & Balachandran, 2018; Kacperczyk & Marx, 2016; Sørensen, 2007; Sørensen & Fassiotto, 2011) and one of the most prevalent structures is organizational bureaucracy (Arnold & Cohen, 2013; Weber, 1924). The formal division of labor favoring expert skills over general skills is a key characteristic of bureaucracy. Bureaucracies are popular employers because they offer career advancement opportunities and are therefore able to attract highly qualified labor, and generally pay higher wages than small firms (Cobb & Lin, 2017; Even & Macpherson, 2012; Kalleberg & Van Buren, 1996; Leontaridi, 1998). Bureaucracies favor expert skills over general skills that are more easily transferable to entrepreneurship. Therefore, bureaucracies are less likely to form entrepreneurs than other organizational structures that favor general skills (e.g. Elfenbein, Hamilton, & Zenger, 2010; Kacperczyk, 2012; Tåg, Åstebro, & Thompson, 2016). However, bureaucracies tend to form entrepreneurs of higher quality (Hvide, 2009), at least if they have had a successful career (Åstebro, Chen, & Thompson, 2011). What we still do not know is the effect of finer grained mechanisms defining bureaucracies and how this affects mobility based on the employee's career advancement.

The general empirical relationship between bureaucracy and mobility entrepreneurship is not yet well understood in entrepreneurship research (e.g. Kacperczyk, 2012; Sørensen, 2007; Tåg et al., 2016) from a career perspective. We are yet to understand why employees pursuing a certain career attainment are likely to move away from their bureaucratic employers; why they opt for entrepreneurship instead of switching jobs; and how career attainment affects their early performance in entrepreneurship, especially among labor groups most favored by bureaucracies. In this paper, this concerns STL<sup>1</sup> employees that are both in high demand on the labor market and in entrepreneurship (Braguinsky, Klepper, & Ohyama, 2012; Elfenbein et al., 2010). This study investigates the relationship between bureaucracy and mobility into entrepreneurship versus a job switch by unpacking two important and opposing forces of bureaucracy – the formal division of labor favoring expert skills and the limits of career advancement (Weber, 1922) potentially pushing out highly skilled individuals.

Based on research on career mobility (e.g. Rider & Tan, 2014; Rider, Thompson, Kacperczyk, & Tåg, 2019), we argue that individuals evaluate entrepreneurial career options relative not only to their current employer but to other employers as well. Hence, the relative comparison of the option of entrepreneurship over a job switch is important to consider in our theorizing of how organizations affect the mobility processes of their employees. We argue that formal division of labor increases expertise and skills that are difficult to transfer outside the employer, thereby limiting entry into entrepreneurship. On the other hand, we argue that the pyramid structure of bureaucracies affects the career advancement opportunities of employees based on their organizational ranks. Specifically, the lack of career advancement is likely to favor entry into entrepreneurship. Furthermore, we argue that both an organizational formal division of labor and the availability of career options within the incumbent organizations have a positive influence on early performance post-entry (entry size), as employees from bureaucratic firms are likely to be highly skilled compared to their counterparts in smaller firms (Kalleberg & Van Buren, 1996).

We test our arguments on a matched employee-employer register data of the Science and Technology Labor Force (STLF) in Sweden for 1990-2008. We sample employees with STEM qualifications with new jobs in 2001 (33,617 individuals) and track their labor market transitions into incorporated entrepreneurship<sup>2</sup> over the subsequent 8 years. Recent research indicates that people moving into an incorporated form of entrepreneurship are different on a number of dimensions to those choosing mere self-employment (Levine & Rubinstein, 2017). We compare

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1 Employees educated in Science, Technology, Engineering and Mathematics (STEM)

2 I focus exclusively on transitions into incorporated entrepreneurship as this ensures a better proxy for entrepreneurship (Levine, R., & Rubinstein, Y. 2017). See details in the ‘Methods’ section.

entry into entrepreneurship with a job switch as both choices represent viable mobility options when employees seek to improve their career.

Our data offers several advantages. First, while a firm's degree of bureaucratization is not directly observable, our dataset provides multiple proxies of bureaucracy that allow us to measure the multiple dimensions of bureaucracies including: the hierarchical structure of the firm – the number of layers in the firm (Tåg et al., 2016) as well as organizational size and age. Prior studies (e.g. Sørensen, 2007) use firm size and age as proxies for bureaucracy to examine the relationship between bureaucracy and entrepreneurship. However, studies suggest that firm size and age are also proxies to other theoretical explanations to the relationship. For example, Parker (2007) suggests a negative relationship between firm size and entrepreneurship due to the self-selection of less risk averse individuals into smaller firms. The use of multiple proxies allows us to better isolate bureaucracy as an effect. Second, our longitudinal data allows us to track individuals from when they enter their new jobs until they move into entrepreneurship or make a job switch. Third, STLF are of particular interest to entrepreneurship research as entrepreneurs from this labor force have high levels of human capital and are often depicted as those most likely to create high growth firms (Braguinsky et al., 2012; Eberhart, Eesley, & Eisenhardt, 2017; Elfenbein et al., 2010) and are seen as forces for economic growth (Acs, Åstebro, Audretsch, & Robinson, 2016; Delmar, Wennberg, & Hellerstedt, 2011). Fourth, a well-defined STLF population provides a homogenous sample mitigating problems with unobserved heterogeneity and also overcomes limitations posed by studies that investigate highly generic samples that are likely to overstate the economic importance of small proprietorships such as caterers and barbershops (Elfenbein et al., 2010).

Our results suggest that for all three measures of bureaucracy – firm size, firm age and firm layers – mobility decreases, but the effect is especially more pronounced for entrepreneurship relative to a job switch. However, we do not find support for our career advancement argument mobility to entrepreneurship with increasing organizational ranks (non-managers versus managers), compared to a job switch for any of the three measures of bureaucracy. We also find that the entry size increases with increasing bureaucracy for two measures of bureaucracy - firm size and firm layers.

These results help advance the research as follows: First, our study complements existing studies in entrepreneurship that examine the role of bureaucratic organizations (e.g. Kacperczyk, 2012; Sørensen, 2007; Tåg et al., 2016) on mobility into entrepreneurship. By zooming in on two important characteristics of bureaucracy – division of labor and hierarchical authority with a well-defined career path - we provide a more nuanced understanding of the mechanisms in bureaucracies that influence career mobility into entrepreneurship relative to a job switch, as both represent viable career alternatives (Rider et al., 2019). Second, by also examining the number of employees upon entry into entrepreneurship, we

provide a more granular understanding of early performance of skilled individuals from bureaucracies (e.g. Henrekson & Sanandaji, 2014; Koudstaal, Sloof, & Praag, 2016; Levine & Rubinstein, 2017; Sørensen & Sharkey, 2014) and develop theoretical arguments as to why we need to separate between the propensity of entering entrepreneurship versus the propensity of succeeding in entrepreneurship. Specifically, the theoretical mechanisms surrounding pre-entry employer bureaucracy are different for the two outcomes of entry and entry size. Bureaucracy is likely to influence not only the entry into entrepreneurship but is also likely to endow employees differently with resources that could influence entry size.

## Theory & Hypotheses

Career mobility is one of the outstanding characteristics of the labor market and modern careers mobility increasingly span movements not only within organizations, but also across organizations (e.g. Bidwell & Mollick, 2015) and into entrepreneurship (Sørensen & Sharkey, 2014). Staying within the organizations, mobility across organizations by means of a job switch or entering entrepreneurship represent three possible career choices that individuals make in their careers (Rider et al., 2019). Bureaucracy – the increased role differentiation and specialization within the organization, paired with the existence of organizational career tracks (Sørensen, 2007; Weber, 1924) - is a prevalent organizational structure that shapes the career choices of their employees. We argue that bureaucracies are complex with many dimensions that may or may not have opposing effects on entrepreneurship. Additionally, research suggests bureaucracy endows employees with different skills and abilities, arranging employees into positions based on organizational ranks (Weber, 1922) thereby indicating that employees are likely to respond differently to the effects of bureaucracy. We posit that bureaucracies exert two opposing forces on their employees' choices of mobility into entrepreneurship or a job switch. We develop our reasoning by investigating how these two forces influence (1) the employee's decision to stay employed and accept its current position or to move into entrepreneurship or opt for a job switch; (2) when entrepreneurship is favored over a job switch job; and (3) how these two forces shape early entrepreneurial performance. On one hand, bureaucracies, through the formal division of labor (Weber, 1922), aim to specialize employees on expert skills where the official in a bureaucracy is entrusted with specialized tasks making it difficult for the official to “squirm out of the apparatus into which he has been harnessed ...the professional bureaucrat is chained to his activity in his entire economic and ideological existence” (Weber, 1922: 337). The expert skills are sometimes specific to the organization that makes movement outside the organization difficult, as the employee's skills become less transferable having the effect of reducing mobility. On the other hand, the hierarchical authority of bureaucracies with a well-defined

career path (Grandjean, 1981) influence the career advancement of employees based on their rank in the organization. This hierarchical authority means that the possibilities for career advancement are reduced as employees move up the career ladder. The lack of future career opportunities would increase mobility outside the bureaucracy as further internal upward mobility is blocked in the focal organization, thereby increasing mobility and performance.

## **Bureaucracy and Mobility into Entrepreneurship**

Despite recent changes such as flatter structures or reduced hierarchies (Alvesson & Thompson, 2004; Burtch, Carnahan, & Greenwood, 2018), bureaucratic structures and actions remain a dominant organizational form. Bureaucracy is prevalent in both public and private sectors (e.g. professional services, healthcare delivery) and it is estimated that the end of bureaucracy will take about half a century (Adler, 2012; Bennis, 2017) suggesting that studying bureaucracy in modern management is still relevant. As organizational sociologist Max Weber argued, “once fully established, bureaucracy is among those social structures which are the hardest to destroy” (Weber, 1922: 328).

We have defined bureaucracy as increased role differentiation and specialization within the organization, paired with the existence of organizational career tracks (Sørensen, 2007; Weber, 1924) as this definition highlights our two suggested mechanisms through which bureaucracy might influence mobility in general and entrepreneurial entry in particular: first, the development of skills in bureaucratic organizations; second, the advancement of careers through the availability of opportunities within bureaucratic organizations.

The division of labor emphasizes that each member of the bureaucracy has a specific task to fulfill. Individuals are trained to specialize in expert tasks, as specialized knowledge used in the efficient production of goods and services is the primary source of superiority for bureaucracies (Weber, 1924). Additionally, the division of labor in organizations arranges employees into clear-cut levels, that group individuals based on the similarity of their job characteristics (Blau, 1970). Such an arrangement organizes employees based on their organizational ranks, where movement from lower ranks to higher ranks in general signifies career advancement where employees in higher ranks have skills different from those in the lower ranks (Weber, 1922).

Bureaucratic organizations, especially large ones, provide an internal labor market (Doeringer & Piore, 1985) with a typical career ladder characterized by progressive development of skill and knowledge – “the official is set for a “career” within the hierarchical order of the public service. He expects to move from the lower, less important and less well paid positions, to the higher positions” (Weber, 1922: 333). Employees in these organizations have chances of promotion and career

advancement, as there are more opportunities within the organization, making employment in these organizations more desirable than employment in smaller organization (Arnold & Cohen, 2013; Kalleberg & Van Buren, 1996; Moore, Gunz, & Hall, 2007).

A limited set of studies have examined the relationship between firm size and entrepreneurship to broadly argue that larger firms, with a higher extent of bureaucratization, dull the kinds of skills, motivations and aspirations that enable employees to enter into entrepreneurship (e.g. Dobrev & Barnett, 2005; Gompers, Lerner, & Scharfstein, 2003; Kacperczyk & Marx, 2016; Sørensen, 2007; Tåg et al., 2016). Although the empirical relationship has been documented in the US as well as Nordic countries such as Denmark and Sweden, the studies provide overly broad explanations to the causal mechanisms of this relationship, although they are indeed highly valuable to understanding career mobility and entrepreneurship. For example, based on Danish data and a general population, Sørensen (2007: 390-391) suggests different mechanisms (e.g. hindering of entrepreneurial skills through role specialization, desirable employment options in bureaucracies compared to smaller firms) affect mobility into entrepreneurship. In another study based on the Swedish data, Tåg et al. (2016) discuss two mechanisms (preference sorting and ability sorting) as possible explanations to the effect of bureaucracy on mobility into entrepreneurship versus a job switch. They found that employees from firms with more layers were less likely to enter entrepreneurship and to switch to another employer, the effects were stronger for entrepreneurship than a job switch. They suggest that the result is likely due in part to preference sorting where employees with a preference for entrepreneurship are likely to prefer employment in smaller firms, and in part due to ability sorting, where employees in smaller firms have broader skills making them more fit for entrepreneurship. Furthermore, Sørensen (2007: 408) posits “with strong evidence of contextual effects in hand, research should turn to deepening our understanding of the mechanisms through which bureaucracy suppresses entrepreneurship”, indicating that there is still a need to understand the fine grained mechanisms that help explain the contextual effects of bureaucracy on mobility into entrepreneurship.

## **The Reward of Specialized Skills**

Our first mechanism zooms into how an important characteristic of bureaucracy – the division of labor – influences mobility into entrepreneurship and job switch, as both represent viable career options. We argue that with increasing bureaucracy, the division of labor makes employees develop specialized skills that are difficult to transfer, thereby limiting mobility but more for entrepreneurship than for job switch, because specialized skills are more easily transferrable to another employer than to entrepreneurship.

Large organizations are attractive employers. These organizations have complex production processes requiring specialized skills and more qualified workers to limit monitoring costs. Larger organizations invest in employee training and the development of skills and expect workers to specialize in activities that are highly suited for complex production processes. Larger organizations also pay higher wages and exhibit greater vertical and horizontal differentiation compared to smaller firms (Child, 1973; Cobb & Stevens, 2017; Kalleberg & Van Buren, 1996; Mellow, 1982). Increased complexity and differentiation implies a detailed division of labor where employees need to specialize leading to efficient and effective goal attainment (Kalleberg & Van Buren, 1996; Weber, 1924). As size increases, productivity gains increase with the division of labor (Becker & Murphy, 1992; Walsh & Lee, 2015).

The division of labor, an important characteristic of bureaucracy, allows larger firms to achieve gains in productivity. Employees of bureaucratic organizations are likely to specialize in skills highly suited for their internal production processes and are also well paid. This makes them undertake a narrow range of tasks rather than a broad range of tasks (Sørensen, 2007). The narrow range of tasks implies that employees from bureaucratic organizations develop human capital that is more specialized than generic.

A strong strand of entrepreneurship research suggests that entrepreneurship can be viewed as a labor market activity different from paid employment. Entrepreneurs are usually classified as individuals who earn their income by exercising their business on their own account, bearing their own risks, and working for personal profits rather than for wages paid by others (Parker, 2009; Shane, 2003). Lazear (2005) suggests an entrepreneur is a “jack of all trades” who specializes in a variety of skills, while those who work for others are specialists. Entrepreneurship is regarded as an activity that requires individuals with a generic form of human capital (Chen & Thompson, 2014; Lazear, 2004). For example, having human capital in broader areas and roles such as organizing, supervising and coordinating activities (Baptista, Lima, & Preto, 2012; Campbell, 2013). Successful entrepreneurship requires the mastery of a wide variety of skills.

With increasing bureaucracy, employees are likely to emerge as specialists with skills potentially suited to the idiosyncratic production process of the incumbent firm. These specialists have access to valuable knowledge but might have little incentives to move, as they are likely to face higher opportunity costs because of better salaries and career advancement opportunities. With increasing bureaucracy, employees have even less incentive to move into entrepreneurship as neither the skill sets nor the opportunities are aligned with entrepreneurship. However, Lazear (2009) suggests that a job switch to another employer is likely to use a part of the skills from the source firm, making a job switch the more likely choice over entrepreneurship to promote their careers. With increasing bureaucracy, employees are more likely to choose paid employment, as organizations are likely to offer

higher salaries and stable careers than entrepreneurship. Employees are likely to perceive a job switch to be a better mobility option than entering entrepreneurship.

In sum, with increasing bureaucracy, organizations are likely to offer higher salaries and better career advancement opportunities, which is likely to decrease mobility outside the employing organization. Furthermore, with the increasing bureaucracy, employees are less likely to move into entrepreneurship than to do a job switch because their skill sets are more likely to be better rewarded by a new employer than in entrepreneurship. Hence, a job switch is likely to be a better career option than moving into entrepreneurship. Stated formally:

Hypothesis 1: With increasing bureaucracy, mobility decreases more for entrepreneurship than for a job switch.

## **End of Career Advancement**

In our second mechanism, we argue that bureaucratic organizations increasingly limit career advancement as employee progress through hierarchical ranks (non-managers versus managers). This forces people to move outside the incumbent organization as the number of positions decreases the higher up a person is in the organization, similar to a pyramid structure. The limited number of advancement opportunities would mean employees looking for alternatives – either through entrepreneurship or a job switch to another employer. We argue that employees facing a diminishing number of possibilities to advance within the bureaucratic organization are more likely to choose entrepreneurship over a job switch upon leaving their employer.

One major dimension of bureaucracy is the basis on which members of the organization are formally divided into positions as illustrated by hierarchical ranks (Weber, 1922). The formal division of labor groups people based on similar tasks and job characteristics. A bureaucratic structure is characterized by the subdivision of responsibilities, which allows organizations to cope with problems associated with large-scale operations. Such a subdivision of labor typifies efficient performance and enhanced productivity. Responsibilities are subdivided by creating roles that allow employees to focus on certain kinds of work (Blau, 1970). For example, Mintzberg (1980) suggests five basic and hierarchical parts of the organization to include the operating core, strategic apex, middle line, supported by technical structure and support staff. The operating core includes workers involved in the basic production of products and services for the organization. The strategic apex includes top managers and their personal staff, whereas the middle line includes managers who are positioned between the strategic apex and the operating core. Overall, Mintzberg provides a basis on which people in organizations are “titled” based on their roles and responsibilities.



The subdivision of responsibilities based on ranks suggests that employees of different ranks have different responsibilities in the hierarchy (Weber, 1922). For example, the lower ranked production workers may be responsible for implementing the day to day production activities of the organization while the higher ranked managers are responsible for tasks that require coordination and management of the lower ranked workers. This would suggest that higher ranked employees (managers) have skills that are more generic in nature (less specialized), relative to the lower ranked employees (non-managers). Specifically, managers are likely to develop skills related to the management of teams and leadership, coordination across divisions, increasing autonomy in decision making while retaining skills related to production. However, non-managers are likely to have the specialized skills (less generic) needed in their particular subdivision.

In addition to employees being arranged based on their organizational ranks in a bureaucracy, sociological theory suggests that bureaucracies are characterized by the progressive development of skills and knowledge (Weber, 1922, 1924). Bureaucracies offer an internal labor market (Doeringer & Piore, 1985), with job ladders that allow the career advancement of employees through wage enhancement and promotion. Compared to less bureaucratic organizations, more bureaucratic organizations offer more and clearer opportunities for promotion and career advancement. Bureaucracies exemplify a typical internal labor market where career advancement from a lower ranked position to a higher ranked position is achieved through a typical job ladder.

However, the pyramid shape of bureaucracy is also likely to have limited career advancement opportunities for higher ranked employees. For example, to move from a rank of manager to the rank of a CEO, it is not hard to imagine that there will be fewer CEO positions, meaning managers have limited career advancement opportunities. Sicherman and Galor (1990) suggest that workers who are not promoted despite having relevant skills, are more likely to quit the incumbent organization.

With increasing ranks, employees are more likely to choose entrepreneurship over a job switch to promote their careers, because their generic skills are potentially more transferable to entrepreneurship than to another employer. Sørensen and Sharkey argue that over time, employees develop organization-specific capabilities (an employee's skills, attributes and abilities that are specific to a particular employee-employer relationship) whose productive value is specific to the organization in which the employee is employed, and would consequently be of no value to a different organization. The authors provide an example using two employees at the same attainment level but differing in their organization-specific capabilities: the employee with higher organization-specific skills is less likely to find alternative employment, therefore preferring entrepreneurship as a career advancement option.

In other words, with increasing bureaucracy, employees in higher ranks (managers) face restricted career advancement opportunities and are likely to be endowed with highly specialized skills that are less likely to be valued in alternate employment (c.f., Campbell, Ganco, Franco, & Agarwal, 2012). Additionally, managers are also likely to be endowed with generic skills suggesting a better match to entrepreneurship than a different employer. Restricted career opportunities make managers more likely to consider options outside their employer for another employer or change their status to entrepreneurship, as the endowed skills are less valuable across a different employer in wage employment, making entry into entrepreneurship a relatively better alternative than a job switch. Stated formally:

Hypothesis 2: With increasing bureaucracy, employees in higher ranks (managers) are more likely than employees in lower ranks (non-managers) to enter to entrepreneurship than opt for a job switch.

## **Bureaucracy and Early Entrepreneurial Performance**

Bureaucracies are attractive to employees because they offer career and skill development as well as higher wages (Even & Macpherson, 2012; Kalleberg & Van Buren, 1996). With increasing bureaucracy, employees are more likely to be able, skilled and have intuitively higher aspiration levels. However, research in entrepreneurship broadly suggests that larger organizations (often assumed to be more bureaucratic), stifle the skills suitable for entrepreneurship (Elfenbein et al., 2010). On one hand, employees in larger firms are endowed with human capital that are highly specialized to the internal production process of the firm (Kacperczyk, 2012; Sørensen, 2007) and less likely to be suited for entrepreneurship. On the other hand, employees from smaller firms are endowed with knowledge in a variety of functional areas, perform a wider range of jobs and tasks, making them relatively well suited for entrepreneurship. Smaller firms are characterized by limited resources, less stable structures and less developed internal labor markets (Baum & Oliver, 1992; Stam, Arzlanian, & Elfring, 2014; Stinchcombe, 1965), all of which contributes to the development of skills more appropriate to entrepreneurship.

However, we argue that with increasing bureaucracy, the likelihood of opting for entrepreneurship is reduced, but if they choose entrepreneurship they will perform better. A strong early and reliable indicator of performance is entry size. Larger entry size is an indication of subsequent growth and overall higher financial performance (Agarwal & Audretsch, 2001; Shah, Agarwal, & Echambadi, 2019). Employees coming from organizations that are more bureaucratic are more likely to be equipped with higher financial resources, and relatively higher human (Kalleberg & Van Buren, 1996) and social capital (Leana III & Van Buren, 1999). On average, they have more highly valued skills, higher salaries and are more likely to have connected with people of similar backgrounds than employees from less

bureaucratic organizations. Furthermore, because of higher opportunity costs, they need to target riskier and more complex opportunities. A strategy to mitigate risks, pool resources and pursue opportunities that are more complex is to enter larger, often with former colleagues with complementary skills (Agarwal, Campbell, Franco, & Ganco, 2016). A large entry size allows the founders to pool resources, share risks and pursue opportunities that are more complex. Furthermore, a larger entry size also provides legitimacy and helps the new entrants venture to secure necessary resources (Hallen & Eisenhardt, 2012; Kaplan, Sensoy, & Strömberg, 2009).

As entrepreneurs from larger organizations are also likely to be endowed with better resources such as financial resources, such individuals can use the additional financial resources to gain external funding through higher collaterals (Elston & Audretsch, 2011), to hire additional employees that can enable a larger entry size upon entry into entrepreneurship (Agarwal & Audretsch, 2001). Additionally, besides being endowed with better resources, entrepreneurs coming from bureaucratic organizations are also likely to have signaling (Spence, 1978) effects. An employee associated with a larger firm is likely to provide a signal for market penetration and is hence likely to attract future employees. This would suggest that entrepreneurs coming from more bureaucratic organizations are more likely to attract human resources due to the signaling effects associated with coming from a bureaucratic organization, than entrepreneurs coming from less bureaucratic ones (Campbell et al., 2012; Dahl & Klepper, 2015).

Hypothesis 3: The propensity to enter entrepreneurship with a larger entry size increases with increasing bureaucracy.

## Methods

**Empirical context:** We test our hypotheses using a linked employee-employer dataset provided by Statistics Sweden (SCB). Bureaucracies are important in the Swedish economic context, making Sweden a good context to test our hypotheses. Sweden is a typical welfare state, a coordinated market economy (CME) with many large employers, where companies are more willing to invest in specific assets whose returns heavily depend on cooperation with other actors (Soskice & Hall, 2001). Large bureaucratic organization in Sweden would expect employees to invest in specialized skills considered critical for the firm's production process, an element crucial to our understanding of an employee's career mobility.

**Constructing the Sample:** Although the emphasis of bureaucratic structures in social science research has often been on manufacturing firms with a large number of blue collar jobs (e.g. Grandjean, 1981), likely to engage relatively low skilled

workers, the concept of bureaucracy has also extended into scientific work (Shibayama, Baba, & Walsh, 2015; Walsh & Lee, 2015), which likely to engage relatively high skilled workers such as scientists and engineers. These studies investigate how bureaucratic characteristics such as the division of labor is extendable in a scientific environment, suggesting that the characteristics of bureaucracy are broadly applicable to work environments that are highly scientific and technical in nature, implying that organizations with STLF employees are also likely to be influenced by the bureaucracy.

We test the hypotheses on STLF employees in all organizations registered in Sweden between 1990 and 2008. Although we have information from 1990, Statistics Sweden provides information on the occupational codes (used for organizational ranks and firm layers) only from 2001. The information prior to 2001 is used to construct the individual, organizational and industry-level control variables. We restrict our sample by applying the following steps: First, we sample STLF graduates who had a new job in 2001. A new job in 2001 ensures that these employees had no prior experience in the focal firm, enables a comparisons of similar employees (Burton, Dahl, & Sorenson, 2017) and reduces left censoring (Yang & Aldrich, 2012). Second, as the dynamics of serial entrepreneurship are different from that of initial entrepreneurship (Sørensen, 2007), we restrict the sample by excluding individuals who were self-employed between 1990 to 2000. Third, we include individuals who were above 22<sup>3</sup> years of age but under 53 years of age in 2001 (Sørensen, 2007) making the maximum age 60 years for the study period. We also exclude observations with missing information on organizational ranks, leaving us with a sample of 251,986 observations consisting of 2,466 transitions into incorporated entrepreneurship. In our sample, employees are at risk of making three choices: remaining in their current employment, transitioning to a different employer with a new job or transitioning into entrepreneurship.

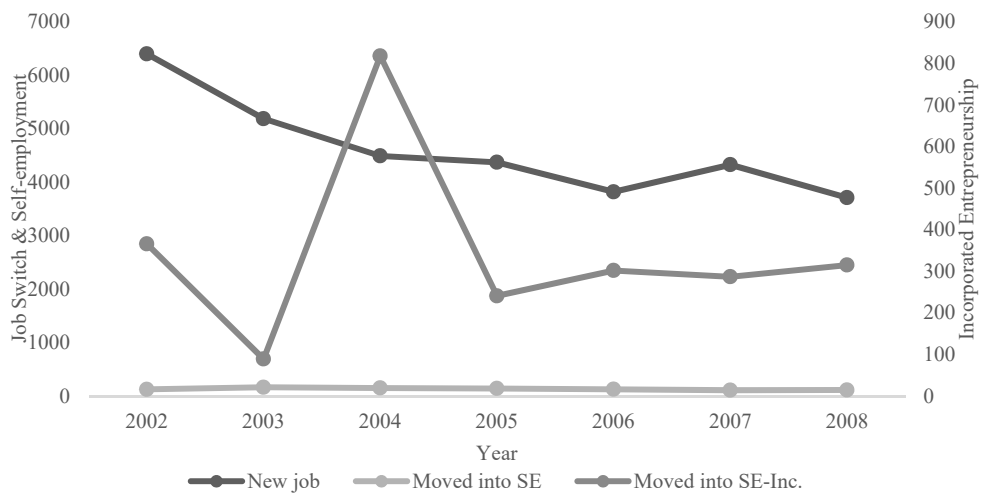
Figure 1 shows the transition graph of employees transitioning into entrepreneurship between 2002 and 2008. For example, in 2002, there were a total of 6,401 transitions into a different job, 125 into self-employment and 366 into incorporated entrepreneurship. In the period 2002-2008<sup>4</sup>, we observe that of total (2,418) transitions into incorporated entrepreneurship, 1,985 (82%) were by men, and among STEM, 1,329 (55%) were by engineers, followed by natural science professionals (492, 19%). We also observe that employees from smaller (less than 50 employees) firms (1,821, 75%) were more likely to venture into entrepreneurship than employees from larger (500+ employees) firms (315, 13%). This suggests an inverse relationship between firm size and entrepreneurial entry, a well-documented relationship in entrepreneurship research (e.g. Kacperczyk & Marx, 2016; Sørensen,

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3 In our sample, the youngest individual with a STEM degree is 22 years of age

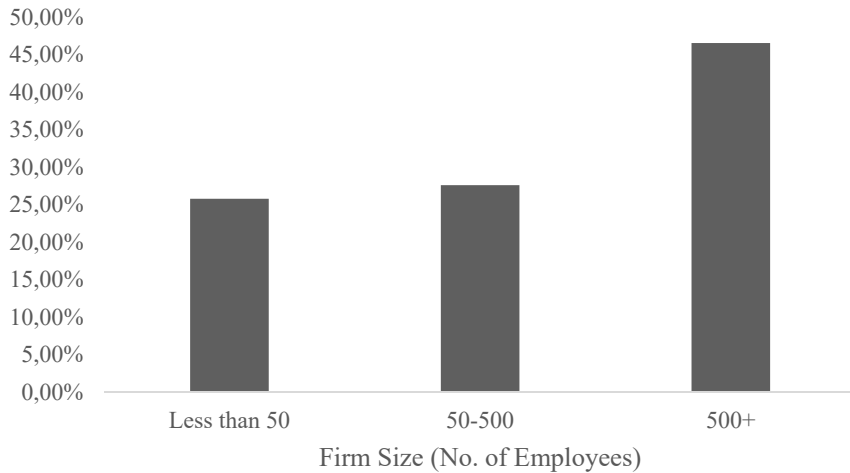
4 For brevity, we do not include all the graphs. The details can be obtained from the author

2007). Entry into entrepreneurship is a rare event among the STLF as they likely benefit from a very rewarding labor market in Sweden. In our sample, we observe that STLF employees are more likely to create incorporated firms than engage in mere self-employment (2,466 transitions into incorporated entrepreneurship while 931 transitions into self-employment). This observation is at odds with other studies (Tåg et al., 2016: 132) that looked at generic samples to find that employees were more likely to venture into self-employment than incorporated entrepreneurship. Additionally, we observe that for employees switching jobs, 45% of the transitions were into firms with more than 500 employees, while 25% of the transitions were into firms with less than 50 employees (see Fig 2). This suggests that employees were likely to find bureaucracies as attractive employers while switching jobs.



**Figure 1**  
Employee Transitions<sup>5</sup>

<sup>5</sup> The increase in transitions from 2003 to 2004 is likely due to a coding error made by Statistics Sweden. Most of them are probably employees who were wrongly coded as individuals in incorporated entrepreneurship. We conduct separate analysis to handle this possible error.



**Figure 2**  
Size of the Firm for Employees Switching into New Job

## Variable Construction

We identify the STLF employees based on education codes provided by SCB that allows us to identify employees based on their educational domains (Science/Technology/ Engineering/Mathematics) as well as their education levels (Bachelors/Masters/PhD). Using the education levels, we include individuals with three years or more of qualified post-secondary education (which includes individuals with doctoral and other postgraduate degrees) (Delmar et al., 2011).

## Dependent Variables

*Employee Mobility:* The dependent variable to test hypotheses 1 and 2 is employee mobility, coded “1” for mobility into incorporated entrepreneurship and “2” for a job switch. The mobility variable is thus coded “1” if the occupational status changes from wage employment in year  $t$  to incorporated entrepreneurship in the year  $t+1$ . To identify entry into entrepreneurship, we follow the strategy used by Statistics Sweden to define an individual entering entrepreneurship if the individual changes their occupational status from paid employment in the current year ( $t$ ) to working in her own company the following year ( $t+1$ ). Statistics Sweden also allows us to separate between sole proprietorship and incorporated entrepreneurship. We focus exclusively on transitions into incorporated entrepreneurship. Although we acknowledge that employees can transition into mere self-employment (sole proprietorship) or incorporated entrepreneurship, a

focus on incorporated entrepreneurship allows us to employ a narrower definition of entrepreneurship.

Research suggests that incorporated entrepreneurship rather than self-employment provides a better proxy for entrepreneurship and is also considered a high-impact entrepreneurship (Levine & Rubinstein, 2017). Additionally, Levine and Rubinstein (2017) suggest that the individuals who enter incorporated entrepreneurship perform activities that demand strong non-routine cognitive skills such as creativity and analytical thinking and are also likely to be more educated. Individuals who create incorporated firms are also known to create 50% more jobs than sole proprietors and are individuals with high ability (Åstebro & Tåg, 2015). The arguments suggest that incorporated entrepreneurship, rather than sole proprietorship is a better proxy for entrepreneurship. Additionally, the observation in our sample that STLF employees transition more into incorporated entrepreneurship than self-employment, suggests that focusing on incorporated entrepreneurship as a proxy for entrepreneurship makes it ideally suited for STLF employees.

Similarly, the variable is coded “2” if the individual’s occupational status indicates wage employment in current year  $t$ , but transitioned to wage employment in a different organization the following year  $t+1$ . No change in employment is coded as “0”.

*Entry Size:* We follow prior research (e.g. Agarwal & Audretsch, 2001) to calculate entry size based on the size of the firm at time  $t+1$ .

## **Independent Variables**

We follow related research (Sørensen, 2007; Tåg et al., 2016) to choose proxies for bureaucracy. In addition to firm size and age, our large and comprehensive dataset allows us to build an additional variable: the number of firm layers that capture the hierarchical structure in an organization. This allows us to test our theoretical prediction about career advancement within the organization and mobility.

*Firm Size* is entered into the model as categorical dummies. The size of the organizations is divided into three categories: 01-49, 50-499, and 500+ employees. The reason for entering categorical dummies instead of a continuous variable is because this provides a better picture of the response variable at various categories of the organizational size (Balachandran, Wennberg, & Wezel, 2015). *Firm Age*: is entered as categorical dummies using the number of years since the organization was registered in Sweden. Since the data available to us is from 1990, and there could be organizations in the dataset that were registered much before 1990, we are using data that is left truncated for organizational age. The age of organizations is divided into three categories: less than 3 years; 3 to 10 years; and more than 10 years. *Firm Layers*: We measure the hierarchical structure of the firm by counting the number of distinct ranks present in the firm. The number of distinct ranks

represents the number of layers in the firm. For example, if a firm has one CEO, one manager, one supervisor, and one production worker, the number of layers in the firm is four. However, for firms with one layer, we assign the highest paid employee as the CEO, resulting in the firm having two, three or four layers (Tåg et al., 2016).

*Organizational Rank*:: We follow Tåg et al. (2016) by using occupational codes<sup>6</sup> provided by Statistics Sweden to categorize employees as managers (CEOs and senior staff) and non-managers (supervisors and production workers). This variable is coded “1” for managers and “0” for otherwise (non-managers).

## Control Variable

At the individual level, we control for the following variables. *Age*: This captures an individual’s age upon entrepreneurial entry. *Stockholm* indicates whether the individual lives in the Stockholm commune. *Gender* - is coded as “1” for men and “0” for women. *Married*: An individual’s preference for entrepreneurship may vary according to his/her marital status. Married is coded as “1” for married and “0” for otherwise. *Number of Children*: A count variable indicating the number of dependent children belonging to the focal individual. *Number of Children under Six*: A count variable indicating the number of children under the age of 6. *Firm tenure*: captures the valuable firm-specific knowledge that determines employee wages (Lazear, 2004). *Capital Income (log)* indicates the interest received on cash deposits that indirectly measure the liquid wealth of the focal individual, and hence accounts for the liquidity constraint (Hurst & Lusardi, 2004). *Sum of job changes*: The total number of job changes undertaken by the employee.

We control for the following employer characteristics. *Firm dissolution*: A binary variable indicating whether the focal organization is dissolved in year  $t$  to isolate the effect of sudden job displacement on entrepreneurial entry (Rider et al., 2014). This control variable is important as our model assumes voluntary labor movement.

*Occupation fixed effects*: This variable captures the occupation of the focal employee. *Industry fixed effects*: This variable controls for industry level heterogeneity. *Year*: Year fixed effects are added to control for other macro-level unobserved changes in the society.

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6 Managers: CEOs (SSYK codes -121, 131, 111, 112), Senior staff (SSYK codes – 122, 123); Non-managers: Supervisors (SSYK codes – 200-399), Production workers (SSYK codes: 400-999)



## Model Specification

Our hypotheses has one main outcome variable - mobility to incorporated entrepreneurship versus a job switch. This variable is categorical with three values “0”, “1” and “2”. We use the multinomial logistic regression (mlogit) model to test our hypotheses for mobility based on the following model:

$$P_i = \Pr(ETP_{i,t+1}=1,2 \mid ETP_{i,t}=0) = \beta_1 + \beta_2 X_i + \beta_3 Z_{it} + \xi_{it} \quad (1)$$

In Equation (1)  $ETP_{it}$  equals 1 if employee  $i$  has ventured into incorporated entrepreneurship at  $t+1$ ,  $ETP_{it}$  equals 2 if employee  $i$  has changed employer at  $t+1$  and 0 otherwise. The vector  $X_i$  is a set of time invariant individual characteristics (such as gender) and the vector  $Z$  is a vector of time-varying characteristics of the employee (wage, relative wage, relative wage dispersion, relative average wage marital status, number of children) and of the employer (e.g. firm size, firm age) and  $\xi_{it}$  represents the residual component not explained by  $X_i$  and  $Z_{it}$ . We estimate Equation (1) only for employees who are paid employees at time  $t$ ; i.e. individuals already in incorporated entrepreneurship are excluded from the estimation. The estimated coefficients can be interpreted as the likelihood of transitioning into incorporated entrepreneurship at  $t+1$  as a function of  $X_i$  and  $Z_{it}$  (Elfenbein et al., 2010).

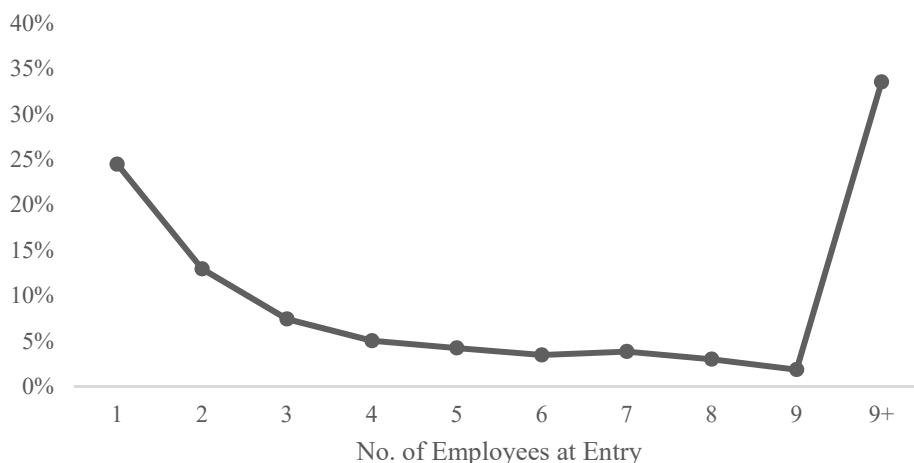
For entry size, we use the negative binomial regression model (Eq. 2) as the descriptives suggest a Poisson distribution of the variable (see fig. 3). We observe that a significant share (33%) of employees enter into incorporated entrepreneurship with an initial size of more than 9 employees<sup>7</sup>.

$$\Pr[Y = y] = \frac{\exp(-\mu_{it}) * \mu_{it}^{y_{it}}}{y!}, y = 1, 2, \dots \quad (1)$$

and  $\mu_{it} = \exp(x_{it}\beta)$  where,  $x_{it}$  = Vector of regressors and  $\beta$  = Maximum Likelihood Estimator

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<sup>7</sup> Our analysis suggests that this is likely due to the SCB coding error for the year 2004. We perform additional analysis to handle this coding error. The results are available in Appendix Table 8b.



**Figure 3**  
Entry Size

## Results

Table 1 shows the descriptive statistics for the entire list of variables used in the study. Table 2 shows the bivariate correlations between the variables used in the study<sup>8</sup>. To interpret our findings, it is important to note the high correlation between firm layers and organizational size ( $r=.67$ ), but a relatively low correlation between firm layers and organizational age ( $r=.37$ ). Organizational age and size are correlated at  $r=.38$ . These correlations indicate that our three indicators for bureaucracy pick up somewhat different underlying dimensions of bureaucracy<sup>9</sup>. In addition to the dependent and independent variables used in the study, Tables 1 and 2 contain the list of various controls related to demography, human capital, employment history and industry.

<sup>8</sup> Due to space constraints, we provide correlation tables only where mobility is the dependent variable. Correlation tables for the other dependent variable, 'Entry Size', can be obtained from the authors on request.

<sup>9</sup> For robustness, we test our main hypotheses using separate models for (1) firm size and firm age, and (2) firms layers controlling for firm size and firm age (Appendix – table 9a and 9b). Our results hold.

**Table 1**  
Summary Statistics

	Mean	SD	Min	Max
Observations	251,986			
(1) Inc. Entrepreneurship	0.32	0.73	0	2
(2) Entry Size	451.30	1682.83	1	6991
(3) Wage (log)	8.21	0.91	0	12.5
(4) Age	38.75	8.08	22	60
(5) Stockholm	0.20	0.40	0	1
(6) Gender (Male)	0.71	0.45	0	1
(7) Married	0.52	0.50	0	1
(8) Children	1.08	1.09	0	10
(9) Children Under 6	0.51	0.78	0	5
(10) Firm Tenure	2.99	1.98	1	8
(11) Capital Income (log)	1.41	2.40	0	14.5
(12) Sum of Job Changes	3.14	1.69	1	15
(13) Managers	0.11	0.31	0	1
(14) Firm Dissolution	0.04	0.19	0	1
(15) Firm Size (categories)	2.29	0.81	1	3
(16) Firm Age (categories)	2.42	0.69	1	3
(17) Firm Layers (categories)	3.59	0.71	2	4

**Table 2**  
Bivariate Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Inc. Entrepreneurship	1.00															
(2) Wage (log)	-0.00	1.00														
(3) Age	-0.08	0.19	1.00													
(4) Stockholm	0.03	0.02	-0.04	1.00												
(5) Gender(Male)	0.01	0.17	0.07	-0.03	1.00											
(6) Married	-0.04	0.09	0.32	-0.12	0.03	1.00										
(7) Children	-0.05	0.06	0.26	-0.14	0.01	0.50	1.00									
(8) Children Under 6	-0.01	-0.07	-0.17	-0.08	0.00 <sup>+</sup>	0.28	0.56	1.00								
(9) Firm Tenure	-0.13	0.09	0.22	-0.05	-0.02	0.10	0.13	0.06	1.00							
(10) Capital Income (log)	-0.02	0.02	0.10	0.02	0.03	-0.08	-0.10	-0.10	0.06	1.00						
(11) Sum of Job Changes	0.01	0.09	0.26	0.03	0.05	0.12	0.15	0.05	-0.17	0.03	1.00					
(12) Managers	-0.02	0.18	0.18	-0.03	0.09	0.14	0.13	0.01	0.03	0.04	0.10	1.00				
(13) Firm Dissolution	0.34	-0.08	-0.01	0.01	0.03	-0.00 <sup>+</sup>	-0.01	-0.01	-0.06	-0.00	0.01	0.01	1.00			
(14) Firm Size (categories)	-0.07	0.12	0.04	-0.06	-0.09	0.02	0.02	0.01	0.12	-0.03	-0.10	-0.07	-0.11	1.00		
(15) Firm Age (categories)	-0.06	0.09	0.04	-0.07	-0.08	0.02	0.04	0.03	0.24	-0.02	-0.04	-0.02	-0.11	0.38	1.00	
(16) Layers (categories)	-0.05	0.18	-0.00 <sup>+</sup>	-0.05	-0.07	0.01	0.01	0.02	0.09	-0.04	-0.08	0.01	-0.14	0.67	0.37	1.00

All correlations are supported at \*\*\* p<0.001 or \*\* p<0.01 or \* p<0.05 except for the ones indicated by +

## Hypothesis Testing

Table 3 reports the multinomial logit estimates of Equation (1) that tests hypothesis 1 (Model 1) using firm size, firm age and the firm layers as proxies for bureaucracy. Models 1 and 2 serve as full models predicting transitions from wage employment at time  $t$ , to entrepreneurship or a job switch at time  $t+1$ . In Model 2 of Table 3 we investigate the interaction effects of the various bureaucracy measures and ranks (managers versus non-managers) on mobility into entrepreneurship versus a job switch.

Additionally, we conduct Chi-square tests of equality of coefficients for the two different outcomes, to demonstrate the effect of the independent variable and how each variable potentially differs between the outcome variables of ‘mobility into incorporate entrepreneurship’ versus ‘job switch’ (Freese & Long, 2000).

Our first hypothesis stated that bureaucracy has a general negative effect on labor mobility, especially for moving into entrepreneurship. The main effects using firm size firm age and firm layers are displayed in Table 3, Model 1. For firm size, we observe that the coefficient for mobility into entrepreneurship for firms with 500+ employees is negative (-1.32;  $p<0.001$ ) and also negative (-0.17;  $p<0.001$ ) for a job switch, but the coefficients are significantly different from each other (Chi2 test: 199.42;  $p<0.001$ ). The omitted category is the firms with less than 50 employees.

For firm age, we observe that for firms older than 10 years, the coefficient for entrepreneurship is negative (-0.58;  $p<0.001$ ), while it is positive (0.33;  $p<0.001$ ) for a job switch, and they are significantly different from each other (Chi2 test: 174.15;  $p<0.001$ ). The omitted category is the firms less than 3 years old.

For firm layers, we find that for firms with four layers, the coefficient for entrepreneurship is negative (-1.08;  $p<0.001$ ) while it is positive (0.33;  $p<0.001$ ) for a job switch (Chi2 test: 351.47;  $p<0.001$ ). The omitted category is firms with two layers.

**Table 3**

Effects of (firm size, firm age, and management layers) and interactions with rank (H2) on mobility. Multinomial logit estimation based on transitions between 2002-2008.

Reference outcome: staying employed with the current firm (N=210,634)	Leave current employment for incorporated entrepreneurship (N=2,466)	Leave current employment for employment in another firm (N=38,886)	Leave current employment for incorporated entrepreneurship (N=2,466)	Leave current employment for employment in another firm (N=38,886)
	(1)		(2)	
<i>Omitted category: Firm Size (less than 50 emp.)</i>				
Firm Size (50-499 employees)	-1.12*** (0.08)	0.13*** (0.02)	-1.12*** (0.15)	0.13** (0.05)
Firm Size (500+ employees)	-1.32*** (0.08)	-0.17*** (0.02)	-1.34*** (0.25)	-0.17 (0.09)
<i>Omitted category: Firm Age (less than 3 years)</i>				
Firm Age (3-10 years)	-0.52*** (0.06)	0.44*** (0.02)	-0.61*** (0.10)	0.43*** (0.08)
Firm Age (10+ years)	-0.58*** (0.07)	0.33*** (0.02)	-0.60*** (0.18)	0.32** (0.10)
<i>Omitted category: Firm Layers (2)</i>				
Firm Layers (3)	-0.79*** (0.06)	0.44*** (0.03)	-0.78*** (0.11)	0.41*** (0.05)
Firm Layers (4)	-1.08*** (0.07)	0.33*** (0.03)	-1.08*** (0.13)	0.30*** (0.06)
Firm Size (50-499) X Rank (Managers)			0.02 (0.22)	0.07 (0.07)
Firm Size (500+ emp.) X Rank (Managers)			0.07 (0.31)	0.06 (0.07)
Firm Age (3-10 yrs.) X Rank (Managers)			0.51*** (0.14)	-0.00 (0.08)
Firm Age (10+ yrs.) X Rank (Managers)			0.12 (0.24)	0.04 (0.09)
Firm Layers (3) X Rank (Managers)			-0.02 (0.18)	0.61*** (0.11)
Firm Layers (4) X Rank (Managers)			0.01 (0.20)	0.63*** (0.11)
<i>Controls</i>				
Wage (log)	0.29*** (0.02)	0.17*** (0.01)	0.29*** (0.02)	0.17*** (0.01)
Managers	0.83*** (0.10)	-0.31*** (0.03)	0.51** (0.16)	-0.92*** (0.11)
Age	0.01** (0.00)	-0.02*** (0.00)	0.01 (0.01)	-0.02*** (0.00)
Gender(Male)	0.24*** (0.05)	-0.03 (0.01)	0.24*** (0.06)	-0.03 (0.02)
Married	0.08 (0.05)	-0.06*** (0.02)	0.08 (0.05)	-0.06*** (0.02)
Stockholm	0.08 (0.05)	0.08*** (0.02)	0.08 (0.06)	0.08* (0.03)
Children	0.05* (0.02)	-0.02** (0.01)	0.05* (0.02)	-0.03** (0.01)
Children Under 6	0.01 (0.03)	0.02 (0.01)	0.01 (0.03)	0.02(0.01)
Firm Tenure	0.01 (0.02)	-0.10*** (0.01)	0.01(0.02)	-0.10*** (0.01)
Capital Income (log)	0.04*** (0.01)	-0.02*** (0.00)	0.04*** (0.01)	-0.02*** (0.00)
Sum of Job Changes	0.02 (0.01)	0.05*** (0.00)	0.02 (0.03)	0.05*** (0.01)
Firm Dissolution	0.86*** (0.11)	3.38*** (0.03)	0.83*** (0.14)	3.39*** (0.12)
Constant	-6.59*** (0.21)	-2.34*** (0.08)	-6.55*** (0.34)	-2.27*** (0.16)
Pseudo R-squared	0.167		0.167	
Log Likelihood	-1.01e+05		-1.01e+05	
Chi2	6.07e+06		897867.18	
Deg. Of Freedom	78.00		90.00	

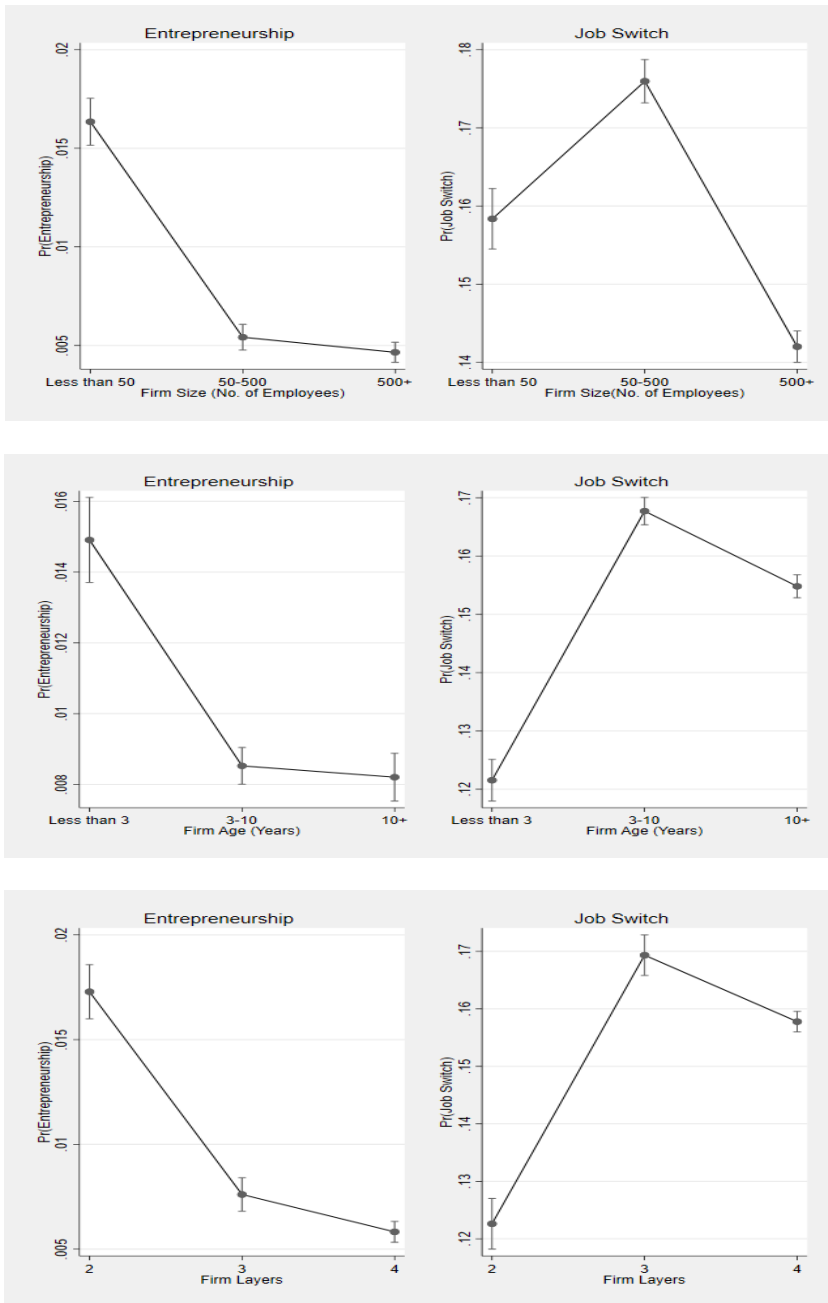
N = 251,986. Standard errors clustered at firm level. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05. Regressions include industry (5), occupation (10) and year fixed effects, and dummy indicating whether firm age is truncated. We also conduct separate analysis (Appendix – tables 7a, 7b, 7c, 7d) for STEM to observe similar results overall. We also conduct additional tests by excluding observations with entry into incorporated entrepreneurship for 2004 to handle the coding error. The results hold (see Appendix-tables 8a and 8b)

For an easier interpretation, we plot the predicted probabilities of entry into incorporated entrepreneurship versus a job switch. Figure 4 (rows 1, 2 and 3) shows entry into entrepreneurship and a job switch with 95% confidence intervals at

different values of firm size, firm age and firm layers. For firm size, we observe that the probability for entering entrepreneurship is 0.015 for firms with less than 50 employees (row 1, left graph), and the probability decreases to 0.005 for firms with more than 500 employees. We observe that for firms with less than 50 employees (row 1, right graph), the probability of a job switch is 0.16, increasing to 0.175 for firms with 50-500 employees, and decreasing to 0.14 for firms with more than 500 employees.

For firm age (row 2, left graph) we observe that the probability for entry into entrepreneurship for firms younger than 3 years is 0.015, and the probability decreases to 0.008 for firms older than 10 years. For job switch, we observe that the probability for firms younger than 3 years (row 2, right graph) is 0.12, increasing to 0.169 for firms 3-10 years old, and decreasing to 0.155 for firms older than 10 years.

For firm layers (row 3, left graph), we observe that the probability for entry into entrepreneurship is approximately 0.0175 for firms with 2 layers, and the probability reduces to 0.006 for firms with 4 firm layers. We observe that the probability of a job switch is 0.12 for firms with 2 layers, increasing to 0.17 for firms with 3 layers, and decreasing to 0.159 for firms with 4 layers.

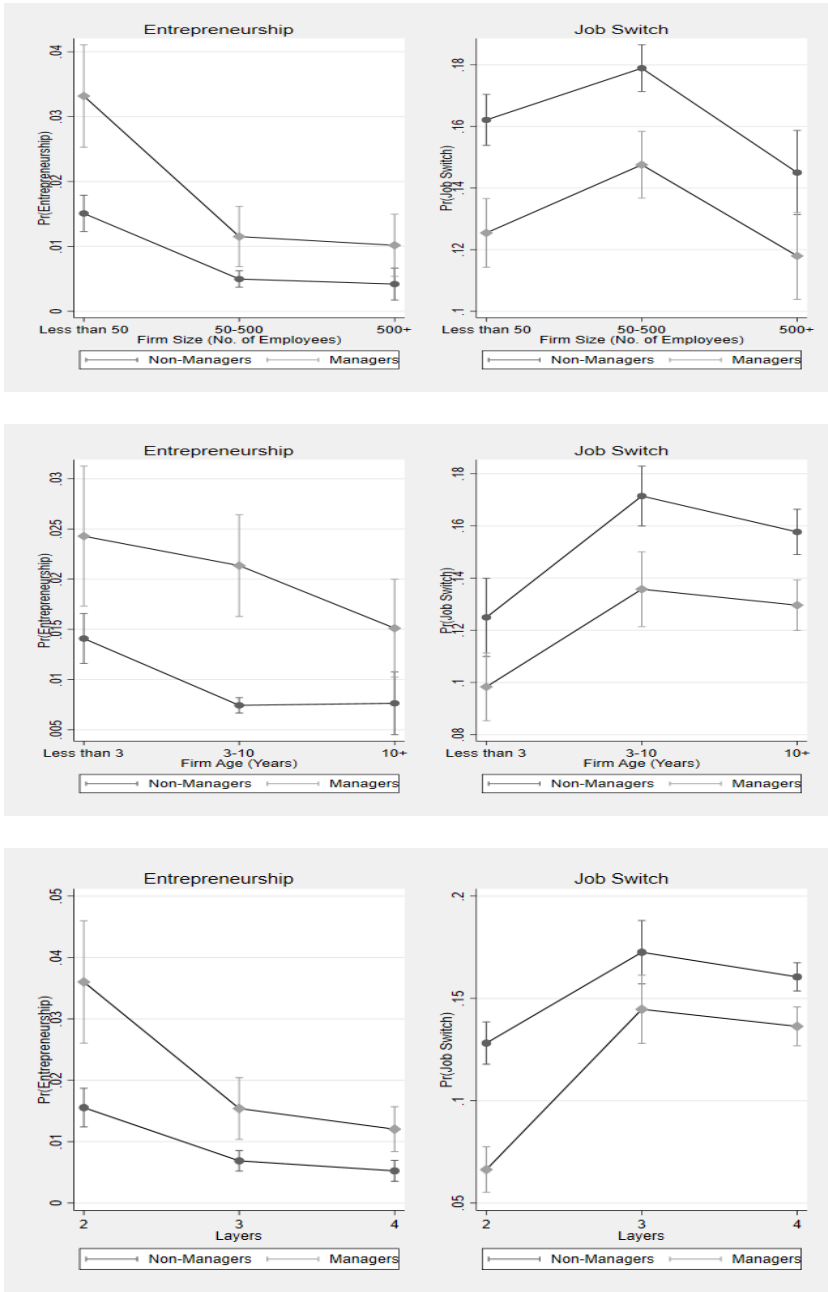


**Figure 4**  
Predictive margins at 95% confidence intervals for model 1 presented in table 3



In sum, we observe that for all three measures of bureaucracy – firm size, firm age and firm layers - mobility decreases (with significant effects) with increasing bureaucracy and the effects are more pronounced for entrepreneurship than a job switch. In addition to the effects being significant, the trends in the marginal plots for all three measures of bureaucracy suggest that the probability for mobility decreases with increasing bureaucracy, with stronger effects on entry into entrepreneurship than on a job switch. We thus find support for our first hypothesis.

Hypothesis 2 stated that with increasing bureaucracy, employees in higher ranks (managers) are more likely than employees from lower ranks (non-managers) to move to entrepreneurship than to a job switch. The results using firm size firm age and number of firm layers and the interactions with each of the measures with rank (managers versus non-managers) are presented in Table 3, Model 2. For all three measures of bureaucracy, we observe that the direct effects are as predicted in hypothesis 1, but the interactions with organizational ranks are largely insignificant (with inconsistent trends). We also plot (Fig. 5) the predicted probability for mobility into entrepreneurship for managers and non-managers interacting with each of the bureaucracy measures to find inconsistent trends. We therefore find no support for hypothesis 2.



**Figure 5**  
Predictive margins at 95% confidence intervals for model 2 presented in table 3

## **Entry Size**

Hypothesis 3 posited increasing entry size with increasing bureaucracy. Upon examination of the effect of firm size, firm age and firm layers on entry size, our results show (Table 4) that the coefficient for firm size increases from 0.68 ( $p < 0.001$ ) for firms with 50-500 employees to 1.07 ( $p < 0.05$ ) for firms with 500+ employees. The omitted category is firms with less than 50 employees. Similarly, for firm age, we observe that the coefficient increases from 0.01 (n.s) for firms aged 3-10 years to 0.59 ( $p < 0.01$ ) for firms more than 10 years old. The omitted category is firms less than 3 years old. Upon examination of the effect of the number of firm layers on entry size, we observe that the coefficient increases from 0.93 ( $p < 0.001$ ) to 1.36 ( $p < 0.001$ ) for firms with three layers and four layers respectively. The omitted category is firms with two layers. Overall, our results indicate that for two measures of bureaucracy – firm size and firm layers – the effects are significant and in the predicted direction, thereby providing support for hypothesis 3.

**Table 4**

Effect of firm size, firm age and firm layers on entry size. Negative binomial estimation based on transitions between 2002-2008.

	Entry Size
	(1)
<i>Omitted category: Firm Size (less than 50 emp.)</i>	
Firm Size (50-499 employees)	0.68*** (0.20)
Firm Size (500+ employees)	1.07* (0.44)
<i>Omitted category: Firm Age (less than 3 years)</i>	
Firm Age (3-10 years)	0.01 (0.11)
Firm Age (10+ years)	0.59** (0.21)
<i>Omitted category: Firm Layers (2)</i>	
Firm Layers (3)	0.93*** (0.12)
Firm Layers (4)	1.36*** (0.15)
Wage (log)	0. (0.07)
Managers	-0.37 (0.21)
Age	-0.01 (0.01)
Gender (Male)	-0.27** (0.09)
Married	-0.04 (0.08)
Stockholm	-0.01 (0.06)
Children	-0.04 (0.04)
Children Under 6	0.05 (0.05)
Firm Tenure	-0.11** (0.03)
Capital Income(log)	0.02 (0.02)
Sum of Job Changes	-0.12*** (0.02)
Firm Dissolution	0.41 (0.31)
Constant	0.56 (0.61)
Observations	2,466
Pseudo R-squared	0.176
Log Likelihood	-9894.87
Chi2	1833.64
DF	37.00

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05.

## Robustness check

### Unobserved sorting

In studies examining the relationship between the role of the employing organization and mobility into entrepreneurship, an oft-voiced concern is the role of sorting or self-selection versus the actual treatment of the focal organization. It is likely that people that sort into bureaucratic organizations are different from people that sort into less bureaucratic ones. Hence, not controlling for sorting might lead us

to confound sorting with the actual effect of the organization. At the individual level, the unobservable could be in terms of traits such as levels of risk-aversion or features of personality that are stable over time. At the firm level, spurious effects of workplace characteristics might influence entrepreneurial entry if an individual self-selects to work in firms that are entrepreneurial (Sørensen, 2007).

A standard method used to address any bias induced due to fixed unobserved individual level variables is to include fixed-effect estimations into the regression models (Halaby, 2004). We follow Sørensen (2007) to include individual fixed effect estimation to control for unobserved heterogeneity. Fixed effects accounts for changes happening at the individual level (within variance) rather than between individuals (between variance) that we have emphasized in our main analysis. We should therefore expect differences, especially as many of the observed individuals actually never make a change. In results found in the appendix (Table 5), such individuals are dropped altogether from a fixed effect analysis and we observe 179,007 individual-years in the fixed effect analysis, compared to 251,986 in the main analysis. Overall, the fixed effects results suggest that for bureaucracy measures of firm size and firm age, there might be some traits such as levels of risk-aversion or features of personality that might lead to spurious results on mobility into entrepreneurship and job switches, hence warranting additional analysis.

*Entropy Balanced (EB) matching.* A major challenge to isolating the effect of bureaucracy on entrepreneurship is handling the sorting of individuals with observable characteristics into firms with varying levels of bureaucracy. To mitigate this concern, we follow Kacperczyk and Balachandran (2018) to estimate the main results matching employees on key observables. We construct a treatment dummy, equal to 1 for employees from firms with less than 50 employees and another treatment dummy, equal to 1 for employees from firms with more than 500 employees. Using these measures, we match employees based on income, age, gender, marital status, number of children, kids under six years of age, tenure in the focal firm, capital income, number of job changes and STEM, in a entropy-balanced matching (Hainmueller, 2012) framework. Third matching generates separate samples to test treatment effects of being employed in small firms (less than 50 employees) and being employed in large firms (500+ employees). Table 6 in the appendix estimates the main models using the logistic regression with the treated dummy using the weights provided by the matching algorithm. Our matching results therefore mitigate the concern of sorting into firms based on varying levels of bureaucratization thereby confirming our main results.

## Discussion

In this study, we examined two important and opposing mechanisms of bureaucracy - the reward of specialized skills through the division of labor and the increasingly limited possibilities for career advancement as employees rise through hierarchies – on mobility into entrepreneurship versus a job switch. We investigate how these two forces influence an employee’s decision to stay employed and accept their current position, to move into entrepreneurship or to switch jobs. In discussing our study, we provide a comparison of our results with two related studies in entrepreneurship – Sørensen (2007) and Tåg et al. (2016). The appendix (Figures 6 and 7)<sup>10</sup> guides the reader to compare our main results to those of Sørensen (2007), while Appendix II guides the reader to compare the main results of our study with those of Tåg et al. (2016).

To test our hypotheses, we used matched employee-employer register data from Statistics Sweden spanning the years 1990-2008. Because we are interested in career mobility, we compared entry into entrepreneurship with a job switch. Our result for hypothesis 1 suggests that independent of the indicator for bureaucracy used, mobility decreases but more for entrepreneurship than a job switch. Our results are a possible reflection of an iron cage where an employee get specialized in his work tasks, making it difficult for him to “squirm out of the apparatus into which he has been harnessed” (Weber, 1922: 337). Although our overall results are in line with previous research, e.g. Sørensen (2007) and Tåg et al. (2016), we find notable differences in certain measures of bureaucracy such as firm size on mobility into entrepreneurship. For example, our coefficient for mobility into entrepreneurship (Appendix Fig 6 – middle row, third quadrant) is notably larger than that of Sørensen (2007), suggesting that our sample of STLF employees is less likely to move into entrepreneurship than the generic sample of that of Sørensen (2007). We also found that for firms with four firm layers, our coefficient for entrepreneurship (Appendix Fig 7 – first row, second column) is about 30% larger than the findings of Tåg et al. (2016).

Plausible explanations for these differences could be attributed to our sample of the highly educated STLF. Our sample, being highly educated, has more employment mobility options in the labor market and is also a highly attractive workforce. They seem to be more likely to move into a stable career in wage employment than the generic labor force. Second, STLF is likely to find wage employment in larger firms as an attractive career option thereby decreasing their propensity to venture into entrepreneurship. The highly educated employees are also more likely to be affected by the number of layers compared to other generic employees.

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<sup>10</sup> To have comparisons on similar measures, we convert our categorical variables based on firm size to log of the number of employees.

We found no support for hypothesis 2 to suggest with increasing ranks, bureaucracy has no influence on an employee's mobility, either towards entrepreneurship or towards a job switch. Tåg et al. (2016) suggest that the propensity to choose entrepreneurship over a job switch rises with each rank. The direct effects for our rank variable (managers) in our main results (Table 3a) reaffirm that employees of higher ranks are more likely to choose entrepreneurship over a job switch. However, on interacting the three measures of bureaucracy with organizational ranks, the effects are trivial and non-significant.

Our study also examines the effect of bureaucracy on performance in entrepreneurship (entry size). Our results on the relationship between various measures of bureaucracy and entry size is at odds with those of similar studies in entrepreneurship such as Sørensen (2007: 402), where the results indicate increasing firm size lowers the rate of different types of entrepreneurship such as team entry and entry with employees. However, our results indicate that entrepreneurs leaving larger bureaucratic firms are likely to be of high quality (being highly skilled), who assemble larger teams, have knowledge and skills, and have the ability to attract and identify human capital (Agarwal et al., 2016; Shah et al., 2019).

## **Research Contributions**

We list three contributions of our study. Firstly, we provide a more nuanced understanding of research that examines the role of bureaucracy on mobility into entrepreneurship. In a prior study on bureaucracy and entrepreneurship, Sørensen (2007: 390-391) examined a sample of the labor market in Denmark between 1990 and 1997 to provide broad explanations (rigidly defined roles and responsibilities, limited development of entrepreneurial skills, workers are more inwardly focused, better prospects for internal career advancement) on how firms with increasing bureaucracy could hinder an employee's propensity to enter into entrepreneurship. We advance knowledge by zooming in on how bureaucracy, identified by the division of labor and hierarchical authority with a well-defined career path, influences an employee's mobility decisions. In doing so, we theorize a mobility model where employees consider entrepreneurship relative to a job switch to advance their careers (Sørensen & Sharkey, 2014). Hence, we depart from many traditional models of self-employment entry treating self-employment as a special case of labor market movement (e.g. Daly, 2015; Lévesque, Shepherd, & Douglas, 2002; Vejsiu, 2011). Our results suggest that the division of labor in bureaucracies develops employee skills that are more specialized to a firm's internal production process thereby limiting mobility, but more so for entrepreneurship than for a job switch.

Second, by examining entry size, we also provide an initial understanding as to how bureaucracies can influence initial performance – the entry size. Prior literature suggests entry size influences subsequent performance in entrepreneurship

(Agarwal & Audretsch, 2001). Our results indicate that with increasing bureaucracy, entrepreneurs are likely to have a better initial performance by assembling larger teams. We therefore provide a guideline for future work that can aim to contribute to the research on entrepreneurial teams (e.g. Backes-Gellner, Werner, & Mohnen, 2015; Hellerstedt, 2009) and its relationship with bureaucracy.

We contribute empirically by drawing our conclusions based on the highly educated workforce in the context of a different labor market (Swedish CME), which allows us to better understand what is happening in a more well-defined population of potential entrepreneurs, thereby advancing our understanding by comparing our results with studies based on generic samples (e.g. Sørensen, 2007; Tåg et al., 2016). A problem with many studies in entrepreneurship is that we tend to study highly heterogeneous groups differing in skills, resources and motivation. Our focus on a more defined group shows a tight connection between the development of human capital through career development in bureaucracies and entry into entrepreneurship (cf., Zucker, Darby, & Brewer, 1998). Highly educated people tend to queue to enter a bureaucratic organization, as they perceive bureaucracies as attractive employers, where many can prosper, but they also find that they can only reach further opportunities if they venture outside their employer. Our results clearly show that for entrepreneurship theory to progress, it must go deeper into the different aspects of a working population, because entering entrepreneurship is strongly linked to the educational attainments and labor market possibilities available to the individual.

## **Practical contribution**

Our results have some practical contributions as well. We see that the division of labor in bureaucracies are strong reasons to move away from an employer. Most of the time, this implies going to another employer, entrepreneurship still represents a minor share here. Incumbent firms need to think more about who exactly they are losing, to what (other employers or entrepreneurship) and why. Career management might become an important basis for competitive advantages.

From a policy perspective, such movements are encouraging as they indicate a strong mechanism of knowledge spill-overs, where the most qualified people move between organizations. Movement into entrepreneurship could be further encouraged here. These people have the skills and competences to identify the best entrepreneurial opportunities (Delmar et al., 2011). At the same time, they are among the most attractive on labor market, hence, they can fail as entrepreneurs without losing in their attractiveness as employees. The perceived switching cost between employment and entrepreneurship must be reduced further here.



## Limitations

There are limitations to our study, but these also constitute promising directions for future research.

First, we use firm size, firm age and the number of firm layers as proxies for bureaucracy. Being a directly unmeasurable quantity, empirical studies on organizational bureaucracy have traditionally relied on indirect measures for bureaucracy. We acknowledge Kacperczyk (2012) study, which focused on the mutual funds industry in the United States and used direct measures of bureaucracy – task discretion and task breadth – to understand bureaucracy’s influence on entrepreneurship. The non-availability of such measures in our dataset does not allow us to use such measures in our study.

Second, the fact that we restrict our sample to one cohort of STLFL employees with a new job in 2001, albeit necessary to reduce unobserved heterogeneity, yields results likely to be different had we studied the whole population of employed, unemployed, and part-time employed people in Sweden. This is likely to influence our results on entrepreneurship entry and change of employer. Moreover, our results are restricted to just one cohort. Our transition table (Table 1) suggests that the Swedish labor market was going through some important changes during our period of observation, and we cannot fully account for these with a single cohort. Future research should sample several cohorts to separate age, cohort and period effects.

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# Appendix i

**Table 5**

Fixed Effects (femlogit) estimation based on transitions between 2002-2008

	Leave current employment for incorporated entrepreneurship	Leave current employment for employment in another firm
Firm Size (categories)	-0.03 (0.06)	-0.11** (0.02)
Firm Age (categories)	0.13** (0.05)	0.03 (0.02)
Firm Layers (categories)	-0.20*** (0.05)	0.13*** (0.02)
Firm Dissolution	0.73*** (0.11)	3.62*** (0.05)
Wage (log)	0.15* (0.05)	0.09*** (0.02)
Managers	0.02 (0.10)	-0.15*** (0.04)
Age	-0.00 (0.03)	0.80*** (0.01)
Married	0.13 (0.11)	0.06 (0.03)
Stockholm	0.13 (0.14)	0.09* (0.04)
#Children	-0.17*** (0.06)	0.02 (0.02)
#Children Under 6	0.13* (0.06)	0.05* (0.02)
Firm Tenure	-0.16*** (0.03)	-0.33*** (0.01)
Capital Income (log)	-0.05*** (0.01)	0.02*** (0.00)
Sum of Job Changes	-0.35*** (0.07)	-3.38*** (0.03)
Observations	179,007	
Pseudo R-squared	0.36	
Log Likelihood	-41939.12	
Chi2	47733.17	
Deg. Of Freedom	30.00	

Standard errors in parenthesis \*\*\* p<0.001, \*\* p<0.01, \* p<0.05. In our results, we find that for firm size, the coefficient for mobility into entrepreneurship is -0.03 (n.s) while that for a job switch is -0.11; p<0.01. For firm age, the coefficient for mobility into entrepreneurship is 0.13; p<0.01 while that for a job switch is 0.03 (n.s). For firm layers, the coefficient for mobility into entrepreneurship is -0.20; p<0.001 while that for a job switch is 0.13; p<0.001.

**Table 6**

Logit estimations based on the weights provided by the entropy balanced matching algorithm

	(1)	(2)
	Leave current employment for incorporated entrepreneurship	Leave current employment for incorporated entrepreneurship
Omitted category: Firm Size (less than 50 employees.)		
Treated (Firm Size less than 50 employees)	0.07** (0.02)	
Treated (Firm Size greater than 500 employees)		-0.29*** (0.01)
Omitted category: Firm Age (less than 3 years.)		
Firm Age (3-10 years)	0.40*** (0.03)	0.31*** (0.02)
Firm Age (10+ years)	0.29*** (0.03)	0.20*** (0.02)
Omitted category: Firm Layers (2)		
Firm Layers (3)	0.23*** (0.03)	0.21*** (0.02)
Firm Layers (4)	0.06* (0.03)	0.12*** (0.02)
Wage (log)	0.12*** (0.03)	0.00 (0.01)
Managers	-0.16*** (0.04)	-0.06 (0.03)
Age	-0.02*** (0.00)	-0.02*** (0.00)
Gender (Male)	-0.06* (0.02)	0.04* (0.01)
Married	-0.08** (0.02)	-0.06*** (0.01)
Stockholm	0.04 (0.02)	0.09*** (0.02)
#Children	-0.00 (0.02)	-0.01 (0.01)
#Children Under 6	0.03 (0.02)	0.00 (0.01)
Firm Tenure	-0.12*** (0.01)	-0.10*** (0.01)
Capital Income (log)	-0.01*** (0.00)	-0.02*** (0.00)
Sum of Job Changes	0.05*** (0.01)	0.06*** (0.00)
Firm Dissolution	2.53*** (0.04)	3.45*** (0.03)
Constant	-1.67*** (0.25)	-0.85*** (0.17)
Observations	220,518	220,518
Deg. Of Freedom	36.00	36.00

Standard errors in parenthesis \*\*\* p<0.001, \*\* p<0.01, \* p<0.05. Regressions include industry (5), occupation (10) and year (8) fixed effects, and dummy indicating whether firm age is truncated. The results in column (1) – the treatment coefficient is positive and significant (0.07; p<0.01) – confirm that the association that employees from firms with less than 50 employees are more likely to venture into entrepreneurship. We repeat this by creating a treatment dummy for those individuals who are from firms with more than 500 employees. The results in column (2) – the treatment coefficient is negative and significant (-0.29; p<0.001) – confirm that the association that employees from firms with more than 500 employees are less likely to venture into entrepreneurship.

**Table 7a**

Multinomial Logit estimations testing Hypothesis 1 (1) and Hypothesis 2 (2) (Scientists)

	Leave current employment for incorporated entrepreneurship	Leave current employment for employment in another firm (1)	Leave current employment for incorporated entrepreneurship (2)	Leave current employment for employment in another firm
Firm Size (50-499 employees)	-1.08*** (0.20)	0.14* (0.06)	-1.09*** (0.25)	0.15 (0.12)
Firm Size (500+ employees)	-0.86*** (0.21)	-0.22*** (0.06)	-0.87 (0.45)	-0.20 (0.12)
Firm Age (3-10 years)	-0.78*** (0.15)	0.42*** (0.06)	-0.85*** (0.23)	0.41*** (0.11)
Firm Age (10+ years)	-0.19 (0.15)	0.32*** (0.06)	-0.17 (0.35)	0.31* (0.13)
Firm Layers (3)	-0.92*** (0.18)	0.46*** (0.07)	-0.87*** (0.24)	0.44*** (0.11)
Firm Layers (4)	-1.30*** (0.21)	0.29*** (0.07)	-1.34*** (0.25)	0.27* (0.12)
Firm Size (50-499 emp.) X Rank (Managers)			0.13 (0.52)	-0.09 (0.22)
Firm Size (500+ emp.) X Rank (Managers)			0.39 (0.75)	-0.14 (0.23)
Firm Age (3-10 yrs.) X Rank (Managers)			0.60 (0.55)	0.17 (0.31)
Firm Age (10+ yrs.) X Rank (Managers)			-0.20 (0.75)	0.21 (0.30)
Firm Layers (3) X Rank (Managers)			-0.13 (0.68)	0.56 (0.34)
Firm Layers (4) X Rank (Managers)			0.29 (0.65)	0.51 (0.35)

N=51, 637. Additional regressors the same as in table 4. Standard errors are clustered at the firm level. \*\*\*p&lt;0.001, \*\*p&lt;0.01, \*p&lt;0.05



**Table 7b**  
Multinomial Logit estimations testing Hypothesis 1 (1) and Hypothesis 2 (2) (Technologists)

	Leave current employment for incorporated entrepreneurship	Leave current employment in another firm	Leave current employment for incorporated entrepreneurship	Leave current employment for employment in another firm
	(1)			(2)
Firm Size (50-499 employees)	-1.10*** (0.17)	0.19*** (0.05)	-1.08*** (0.22)	0.20** (0.07)
Firm Size (500+ employees)	-1.57*** (0.25)	-0.10 (0.05)	-1.63*** (0.31)	-0.08 (0.11)
Firm Age (3-10 years)	-0.50*** (0.12)	0.29*** (0.05)	-0.52** (0.16)	0.29** (0.10)
Firm Age (10+ years)	-0.88*** (0.18)	0.17*** (0.05)	-0.92*** (0.22)	0.16 (0.12)
Firm Layers (3)	-0.79*** (0.14)	0.32*** (0.06)	-0.77*** (0.19)	0.29*** (0.08)
Firm Layers (4)	-1.13*** (0.17)	0.25*** (0.06)	-1.15*** (0.24)	0.23** (0.09)
Firm Size (50-499 emp.) X Rank (Managers)			-0.31 (0.59)	-0.17 (0.22)
Firm Size (500+ emp.) X Rank (Managers)			0.39 (0.60)	-0.28 (0.23)
Firm Age (3-10 yrs.) X Rank (Managers)			0.28 (0.35)	-0.01 (0.24)
Firm Age (10+ yrs.) X Rank (Managers)			0.42 (0.56)	0.31 (0.25)
Firm Layers (3) X Rank (Managers)			-0.13 (0.51)	0.64 (0.33)
Firm Layers (4) X Rank (Managers)			0.22 (0.48)	0.56 (0.34)

N=37,275. Additional regressors the same as in table 4. Standard errors are clustered at the firm level. \*\*\*p<0.001, \*\*p<0.01, \*p<0.05

**Table 7c**  
Multinomial Logit estimations testing Hypothesis 1 (1) and Hypothesis 2 (2) (Engineers)

	Leave current employment for incorporated entrepreneurship	Leave current employment in another firm	Leave current employment for incorporated entrepreneurship	Leave current employment in another firm
	(1)		(2)	
Firm Size (50-499 employees)	-1.05***(0.10)	0.12*** (0.03)	-1.03*** (0.17)	0.10* (0.05)
Firm Size (500+ employees)	-1.57*** (0.12)	-0.17*** (0.03)	-1.60*** (0.18)	-0.18 (0.11)
Firm Age (3-10 years)	-0.42*** (0.08)	0.48*** (0.03)	-0.53*** (0.10)	0.48*** (0.10)
Firm Age (10+ years)	-0.73*** (0.09)	0.37*** (0.03)	-0.79*** (0.14)	0.37** (0.12)
Firm Layers (3)	-0.75*** (0.08)	0.49*** (0.04)	-0.75*** (0.13)	0.44*** (0.07)
Firm Layers (4)	-1.02*** (0.09)	0.39*** (0.04)	-1.04*** (0.15)	0.35*** (0.08)
Firm Size (50-499 emp.) X Rank (Managers)			-0.08 (0.25)	0.13 (0.08)
Firm Size (500+ emp.) X Rank (Managers)			0.20 (0.29)	0.10 (0.08)
Firm Age (3-10 yrs.) X Rank (Managers)			0.56*** (0.17)	-0.13 (0.09)
Firm Age (10+ yrs.) X Rank (Managers)			0.35 (0.23)	-0.12 (0.10)
Firm Layers (3) X Rank (Managers)			-0.01 (0.21)	0.66*** (0.14)
Firm Layers (4) X Rank (Managers)			0.09 (0.23)	0.66*** (0.14)

N=142,926. Additional regressors same as in table 4. Standard errors are clustered at the firm level. \*\*\*p<0.001, \*\*p<0.01, \*p<0.05

**Table 7 d**

Multinomial Logit estimations testing Hypothesis 1 (1) and Hypothesis 2 (2) (Mathematicians)

	(1)		(2)	
	Leave current employment for incorporated entrepreneurship	Leave current employment for employment in another firm	Leave current employment for incorporated entrepreneurship	Leave current employment for employment in another firm
Firm Size (50-499 employees)	-1.43*** (0.37)	0.01 (0.08)	-1.35*** (0.38)	-0.01 (0.09)
Firm Size (500+ employees)	-1.55*** (0.39)	-0.22* (0.09)	-1.58*** (0.44)	-0.23 (0.12)
Firm Age (3-10 years)	-0.43 (0.25)	0.45*** (0.09)	-0.47 (0.27)	0.44*** (0.13)
Firm Age (10+ years)	-0.74* (0.33)	0.24** (0.09)	-0.85* (0.35)	0.21 (0.15)
Firm Layers (3)	-0.71** (0.27)	0.39*** (0.10)	-0.82** (0.31)	0.39*** (0.11)
Firm Layers (4)	-1.98*** (0.31)	0.33** (0.10)	-1.81*** (0.34)	0.32** (0.12)
Firm Size (50-499 emp.) X Rank (Managers)			-0.61 (1.24)	0.22 (0.29)
Firm Size (500+ emp.) X Rank (Managers)			0.03 (1.02)	0.17 (0.28)
Firm Age (3-10 yrs.) X Rank (Managers)			0.14 (0.47)	0.17 (0.30)
Firm Age (10+ yrs.) X Rank (Managers)			0.61 (0.77)	0.31 (0.31)
Firm Layers (3) X Rank (Managers)			0.38 (0.57)	-0.05 (0.40)
Firm Layers (4) X Rank (Managers)			-0.78 (0.86)	0.24 (0.38)

N=207, 48. Additional regressors same as in table 4. Standard errors are clustered at the firm level. \*\*\*p&lt;0.001, \*\*p&lt;0.01, \*p&lt;0.05 Table 8a

**Table 8a**

Multinomial Logit estimations testing Hypothesis 1 (1) and Hypothesis 2 (2) after handling the coding error

Reference outcome: staying employed with the current firm	Leave current employment incorporated entrepreneurship (N=1,651)	Leave current employment for employment in another firm (N=38,886)	Leave current employment incorporated entrepreneurship (N=1,651)	Leave current employment for employment in another firm (N=38,886)
	(1)		(2)	
Omitted category: Firm Size (less than 50 emp.)				
Firm Size (50-499 employees)	-1.02*** (0.09)	0.13*** (0.02)	-1.01*** (0.12)	0.13** (0.05)
Firm Size (500+ employees)	-1.32*** (0.10)	-0.17*** (0.02)	-1.34*** (0.16)	-0.17 (0.09)
Omitted category: Firm Age (less than 3 years)				
Firm Age (3-10 years)	-0.52*** (0.07)	0.44*** (0.02)	-0.60*** (0.09)	0.44*** (0.08)
Firm Age (10+ years)	-0.61*** (0.08)	0.33*** (0.02)	-0.65*** (0.11)	0.32** (0.10)
Omitted category: Firm Layers (2)				
Firm Layers (3)	-0.74*** (0.08)	0.44*** (0.03)	-0.75*** (0.10)	0.41*** (0.05)
Firm Layers (4)	-1.01*** (0.08)	0.34*** (0.03)	-1.02*** (0.13)	0.30*** (0.06)
Firm Size (50-499 emp.) X Rank (Managers)			-0.07 (0.24)	0.06 (0.07)
Firm Size (500+ emp.) X Rank (Managers)			0.16 (0.27)	0.05 (0.07)
Firm Age (3-10 yrs.) X Rank (Managers)			0.51** (0.16)	-0.01 (0.08)
Firm Age (10+ yrs.) X Rank (Managers)			0.27 (0.22)	0.04 (0.09)
Firm Layers (3) X Rank (Managers)			0.05 (0.20)	0.62*** (0.11)
Firm Layers (4) X Rank (Managers)			0.10 (0.21)	0.64*** (0.11)

N=251,171. Standard errors are clustered at the firm level, \*\*\* p<0.001, \*\* p<0.01, \* p<0.05. Additional regressors, not reported, are the same as in table 4. Standard errors are clustered at the firm level.

**Table 8b**

Negative Binomial estimations testing Hypothesis 2 after handling the coding error

	Entry Size
Omitted category: Firm Size (less than 50 emp.)	
Firm Size (50-499 employees)	0.61** (0.20)
Firm Size (500+ employees)	-0.21 (0.35)
Omitted category: Firm Age (less than 3 years)	
Firm Age (3-10 years)	0.03 (0.12)
Firm Age (10+ years)	0.50* (0.21)
Omitted category: Firm Layers (2)	
Firm Layers (3)	0.76*** (0.11)
Firm Layers (4)	1.17*** (0.15)

N=1,651, \*\*\* p<0.001, \*\* p<0.01, \* p<0.05. Additional regressors, not reported, are the same as in table 4. Standard errors are clustered at the firm level.

**Table 9a**

Effects of bureaucracy (firm size, firm age, and firm layers on the probability of leaving current employment on mobility (H 1). Multinomial logit estimation based on transitions between 2002-2008.

	(1)		(2)	
Reference outcome: staying employed with the current firm (N=210,634)	Leave current employment for incorporated entrepreneurship (N=2,466)	Leave current employment for employment in another firm (N=38,886)	Leave current employment for incorporated entrepreneurship (N=2,466)	Leave current employment for employment in another firm (N=38,886)
Omitted category: Firm Size (less than 50 emp.)				
Firm Size (50-499 employees)	-1.69*** (0.07)	0.27*** (0.02)		
Firm Size (500+ employees)	-2.02*** (0.06)	-0.04* (0.02)		
Omitted category: Firm Age (less than 3 years)				
Firm Age (3-10 years)	-0.76*** (0.06)	0.49*** (0.02)		
Firm Age (10+ years)	-0.90*** (0.07)	0.38*** (0.02)		
Omitted category: Firm Layers (2)				
Firm Layers (3)			-1.18*** (0.10)	0.51*** (0.06)
Firm Layers (4)			-1.91*** (0.17)	0.37*** (0.07)
Controls				
Wage (log)	0.25*** (0.02)	0.19*** (0.01)	0.27*** (0.02)	0.18*** (0.01)
Rank (Managers)	0.68*** (0.10)	-0.30*** (0.03)	0.96*** (0.11)	-0.32*** (0.05)
Age	0.06* (0.03)	-0.03** (0.01)	0.05 (0.03)	-0.03** (0.01)
Age (Squared)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
Gender (Male)	0.25*** (0.05)	-0.03* (0.01)	0.28*** (0.07)	-0.03 (0.02)
Married (yes)	0.08 (0.05)	-0.06*** (0.02)	0.08 (0.05)	-0.07*** (0.02)
Stockholm	0.08 (0.05)	0.08*** (0.02)	0.08 (0.06)	0.09** (0.03)
#Children	0.04 (0.03)	-0.03** (0.01)	0.04 (0.03)	-0.02* (0.01)
Kids Under 6	0.00 (0.03)	0.02* (0.01)	-0.01 (0.03)	0.02 (0.01)
Firm Tenure	0.36*** (0.06)	-0.20*** (0.02)	0.13 (0.08)	-0.15*** (0.04)
Firm Tenure (squared)	-0.05*** (0.01)	0.01*** (0.00)	-0.03* (0.01)	0.01 (0.00)
Capital Income (log)	0.04*** (0.01)	-0.02*** (0.00)	0.04*** (0.01)	-0.02*** (0.00)
Sum of Job Changes	0.02 (0.01)	0.05*** (0.00)	0.03 (0.03)	0.06*** (0.01)
Firm Dissolution=1	1.01*** (0.11)	3.34*** (0.03)	0.94*** (0.14)	3.34*** (0.11)
Firm Size			-0.00*** (0.00)	-0.00** (0.00)
Firm Age			-0.04 (0.02)	0.01 (0.01)
Constant	-7.82*** (0.55)	-2.10*** (0.17)	-7.46*** (0.70)	-2.06*** (0.26)
Pseudo R-squared	0.165		0.164	
Log Likelihood	-1.02e+05		-1.02e+05	
Chi2	6.27e+06		824518.34	
DF	78.00		78.00	

N = 251,986. Standard errors are clustered at the firm level. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05. Regressions include industry (5), occupation (10) and year (8) fixed effects, and dummy indicating whether firm age is truncated. We also conduct separate analysis (unreported) for scientists, technologists, engineers and mathematicians to observe similar results overall.

**Table 9b**

Effects of bureaucracy (firm size, firm age and number of firm layers) moderated by organizational rank (managers) on the probability of leaving current employment on mobility (Hypothesis 2). Multinomial logit estimation based on transitions between 2002-2008.

	(1)		(2)	
Reference outcome: staying employed with the current firm (N=210,634)	Leave current employment for incorporated entrepreneurship (N=2,466)	Leave current employment for employment in another firm (N=38,886)	Leave current employment for incorporated entrepreneurship (N=2,466)	Leave current employment for employment in another firm (N=38,886)
Firm Size (50-499 emp.) X Rank (Managers)	0.21(0.20)	0.13*(0.07)		
Firm Size (500+ emp.) X Rank (Managers)	0.37(0.31)	0.12(0.07)		
Firm Age (3-10 yrs.) X Rank (Managers)	0.38**(0.14)	0.13(0.08)		
Firm Age (10+ yrs.) X Rank (Managers)	-0.09(0.23)	0.20*(0.09)		
Firm Layers (3) X Rank (Managers)			0.23(0.17)	0.68***(0.11)
Firm Layers (4) X Rank (Managers)			0.17(0.29)	0.73***(0.10)

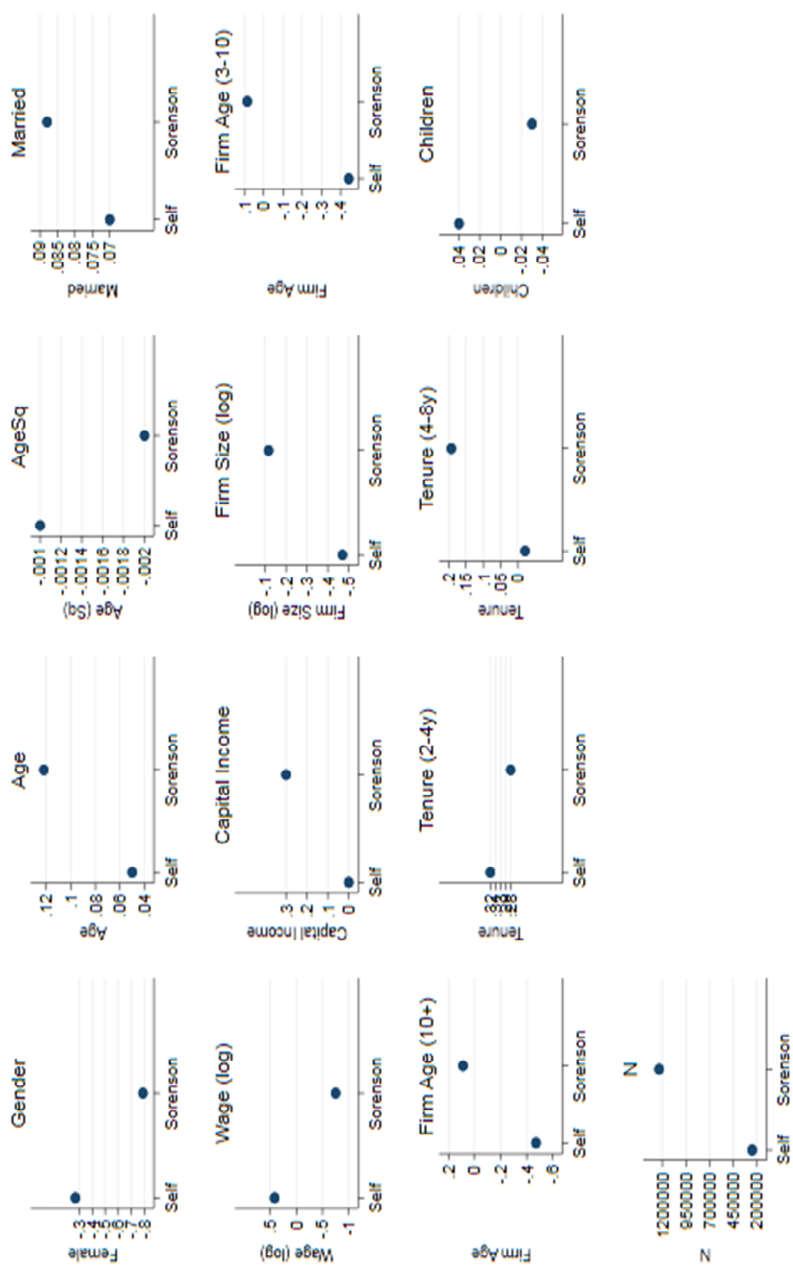
N = 251,986. Additional regressors, not reported, are the same as in table 4. Standard errors are clustered at the firm level. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05. In unreported regressions, we conduct additional regressions using span of control on span of control but do not find significant results.

**Table 9c**

Effect of firm size, firm age and firm layers on entry size. Negative binomial estimation based on transitions between 2002-2008.

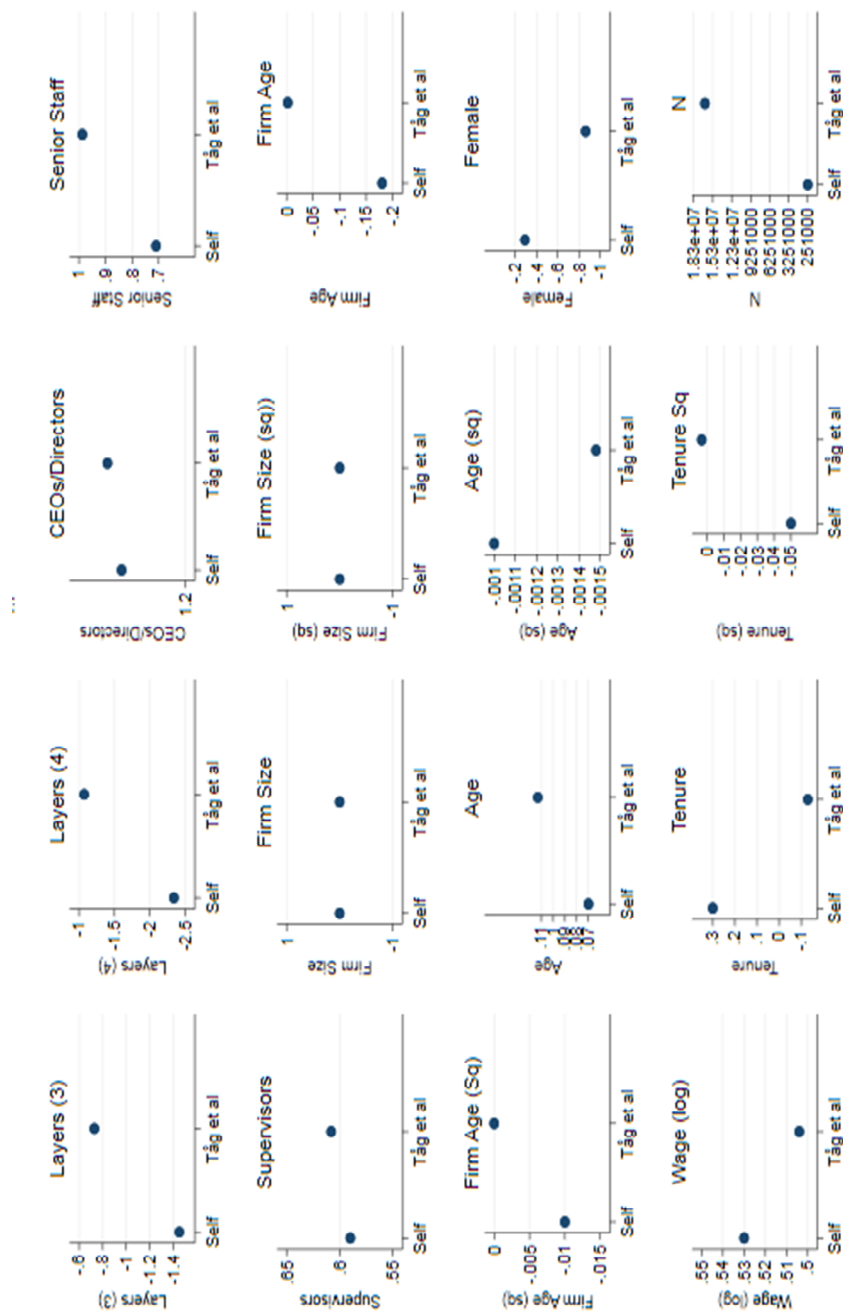
	(1)	(2)
	Entry Size	Entry Size
Omitted category: Firm Size (less than 50 emp.)		
Firm Size (50-499 employees)	1.38***(0.23)	
Firm Size (500+ employees)	1.95***(0.43)	
Omitted category: Firm Age (less than 3 years)		
Firm Age (3-10 years)	0.17(0.14)	
Firm Age (10+ years)	0.88***(0.23)	
Omitted category: Firm Layers (2)		
Firm Layers (3)		0.99***(0.12)
Firm Layers (4)		1.89***(0.21)

Standard errors are clustered at the firm level, \*\*\* p<0.001, \*\* p<0.01, \* p<0.05. Additional regressors, not reported, are the same as in table 4. Standard errors are clustered at the firm level.



**Figure 6**  
Comparison of results with (Sørensen, 2007)





**Figure 7**  
Comparison of results with (Tåg et al., 2016)

## Paper II





# Relative Income, Mobility, and Returns from Entrepreneurship among the Science and Technology Labor Force (STLF) in Sweden

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## Abstract

Increasing income inequality has garnered significant interest among researchers and policy makers. However, despite our knowledge of its linkages with labor market mobility, the mechanisms, especially towards entrepreneurship remain poorly understood. This paper investigates how income inequality, indicated by an employee's relative income, influences mobility into entrepreneurship versus a job

switch, and how this relationship is moderated by an employee's organizational rank. Individuals care about their relative position in the society and place importance on how much better or worse they are compared to the others in the collective. Using social comparison as the key mechanism, we test our hypothesis on a sample of Swedish employees from the Science and Technology Labor Force (STLF) from 1990-2008. Our results suggest that employees with lower relative income are more likely than employees with higher relative income to enter entrepreneurship than to switch jobs. However, we do not find support for the relationship being moderated by an employee's organizational rank. We also find that employees with lower relative incomes have a lower initial income and also a lower entry size on mobility into entrepreneurship, than employees with a higher relative income.

**Keywords:** Entrepreneurial entry, relative incomes, entry size, entrepreneurial performance

## Introduction

Increasing income inequality in developed economies has attracted substantial interest among social scientists and policy makers (see Deaton, 2013; Piketty, Goldhammer, & Ganser, 2014). As an indicator of income inequality, relative income – one's own income compared to that of others' – is considered an important antecedent, not only to individual behavior and outcomes, such as increased risk taking, morale, job satisfaction (Clark, Frijters, & Shields, 2008; Layard, Mayraz, & Nickell, 2010; Payne, Brown-Iannuzzi, & Hannay, 2017) but also on mobility across organizations and into entrepreneurship (Andersson Joona & Wadensjö, 2013; Nikolaev & Wood, 2018). Modern careers increasingly encompass multiple occupations and employee remunerations and awards are crucial to understanding labor market mobility (Baron & Bielby, 1980; Bidwell & Mollick, 2015; Castilla, 2008). Although relative incomes have been associated with outcomes such as increased risk-taking and mobility across occupations, the mechanisms linking relative incomes and career mobility of employees, especially mobility into entrepreneurship, are poorly understood.

Building on our understanding that relative income affects individual outcomes and labor market mobility, we investigate the effect of an employee's relative income on mobility into entrepreneurship versus a job switch among highly skilled employees from the Science and Technology Labor Force (STLF)<sup>1</sup> in Sweden. Based on research on career mobility (e.g. Rider & Tan, 2014; Rider, Thompson, Kacperczyk, & Tåg, 2019), we propose that individuals evaluate entrepreneurial

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<sup>1</sup> Individuals educated in Science, Technology, Engineering and Mathematics (STEM)

career options relative not only to their current employer but, other employers as well. We use social comparison (Festinger, 1954; Suls & Wheeler, 2000) as the key mechanism to investigate how an individual's relative income position effects mobility into entrepreneurship relative to a job switch, and how this effect is moderated by an employee's organizational rank (managers versus non-managers). Additionally, we investigate how an employee's relative income position influences initial returns from entrepreneurship and entry size.

We test our claims using matched employee-employer register data of STLF income earners (graduates and above) in Sweden for 1990-2008 (33,617 individuals) with new jobs in 2000, and track their labor market transition into incorporated entrepreneurship<sup>2</sup> from 2001-2008. Our design offers the following advantages: first, with increasing returns to education (Mouw & Kalleberg, 2010), such a highly qualified labor force is ideally suited for examining the influence of income inequality on labor market mobility. Second, a focus on a well-defined STLF population provides a homogenous sample with less unobserved heterogeneity and also overcomes limitations posed by studies that investigate highly generic samples (Elfenbein, Hamilton, & Zenger, 2010). This allows us to examine employees with similar observable characteristics and career opportunities.

Our results indicate that mobility increases for individuals with a significantly lower relative income, compared to those with a higher relative income, more so for entrepreneurship than a job switch. However, the results do not provide support for the relationship between relative incomes and mobility being moderated by an employees' rank in the organization. We also find that employees with a significantly lower relative income demonstrate lower entry size and lower initial returns on entry into entrepreneurship.

Our study complements existing studies in entrepreneurship that examine the role of relative incomes on mobility into entrepreneurship (Andersson Joona & Wadensjö, 2013; Nikolaev & Wood, 2018; Werner, Gast, & Kraus, 2014). Firstly, using social comparison theory, we provide a theoretical understanding of the mechanisms that influence career mobility into entrepreneurship versus a job switch, on a more well-defined population of potential entrepreneurs. Secondly, by examining mobility into entrepreneurship versus an alternate job, we depart from many traditional models of self-employment entry treating self-employment as a special case of labor market movement (e.g. Daly, 2015; Lévesque, Shepherd, & Douglas, 2002; Vejsiu, 2011). Thirdly, by examining entry size and returns from entrepreneurship, we contribute to the discussion by verifying our findings using alternative definitions of the "entrepreneur" (Lindquist, Sol, & Van Praag, 2015).

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<sup>2</sup> We focus on mobility into incorporated entrepreneurship as this allows us to examine the career mobility of "Schumpeterian" entrepreneurs (Levine & Rubinstein, 2017).

# Theory & Hypotheses Development

## Income Inequality and Relative Income

Inequality is often investigated as a part of broader analysis of poverty and welfare, although the three are conceptually distinct. Inequality is a broader concept that covers the *entire* distribution, not only the censored distribution of households or individuals below the poverty line (Litchfield, 1999). For this study, we follow a broad definition of income inequality<sup>3</sup> that refers to the distribution of income and its variance across members of a collective,<sup>4</sup> such as an organization or a country, and can be described in many ways (Cobb, 2016). For example, income inequality can be used to describe the variance in income distribution (as measured by the Gini coefficient) or it could be used to describe the effects of an individual's relative position in the distribution (e.g. income distribution) (Donovan, 2015; Payne et al., 2017).

Research examining the influence of income on individual outcomes (such as life satisfaction and happiness) suggests that individuals care about their *relative* position in the society (e.g. Cheung & Lucas, 2016; Clark et al., 2008; Tsui, 2014). Individuals tend to place more importance on how much better or worse they are in comparison to the others in the collective. For example, at the country level, using data from the German Socio-Economic Panel (GSOEP), Ferrer-i-Carbonell (2005) demonstrated that the income of the reference group is seen as being as important as one's own income. An individual's happiness depends on how much more (or less) one earns relative to the comparison group. Specifically, how well an individual feels about how he or she is doing in the society is more affected by his or her relative standing than by the absolute income (Frank, 1985). One's relative position in income distribution influences an individual's attitude and behaviors (Clark et al., 2008) and individual decision making (Payne et al., 2017). Relative income is at least as important as absolute income to determine life satisfaction (Cheung & Lucas, 2016).

Relative comparison of one's income to that of the others have been theorized to be an element that influences factors such as happiness and well-being (Clark et al., 2008; Luttmer, 2005). Theory suggests that the relative position in the income distribution is a basis for social comparison and that the relative position of individuals affects their decision-making. Studies suggest that differences in income

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<sup>3</sup> For a detailed discussion about various definitions and measures of income inequality, see Allison, P. D. 1978. Measures of Inequality. *American Sociological Review*, 43(6): 865-880., Dalton, H. J. T. E. J. 1920. The measurement of the inequality of incomes. 30(119): 348-361.

<sup>4</sup> A collective broadly refers to a collection of individuals aggregated into larger groups such as the household, an organization or a country.

are likely to affect the behaviors and attitudes of individuals, in part, due to social comparison processes. Individuals tend to compare their pay with similar others. This comparison is likely to affect their behaviors and outcomes. Risk and uncertainty play an important role in an individual's decision making. Research suggests that based on objective income, the poorer tend to be risk averse as they are likely to have little margin or loss, however, relative disadvantage in comparison to others makes individuals take higher risks, as individuals tend to catch up with others (Dohmen et al., 2011; Payne et al., 2017). Applied to entrepreneurship, this understanding has motivated research that seeks to investigate how one's relative position in the income distribution influences an individual's attitude, intention and decision to venture into self-employment (Andersson Joona & Wadensjö, 2013; Nikolaev & Wood, 2018; Werner et al., 2014).

### **Relative Income and Mobility into Entrepreneurship versus a Job Switch**

The theory of social comparison (Festinger, 1954; Suls & Wheeler, 2000) suggests that individuals are likely to compare themselves to similar individuals by means of important dimension such as income. A general understanding is that individuals with a lower income develop an upward comparison to those with a higher income, generally suggesting that individuals need more to be satisfied, while a downward comparison suggests individuals are satisfied with less (Payne et al., 2017). This indicates that social comparison is likely to lead to those with a lower relative income needing more, thereby suggesting a higher turnover for those with a lower relative income than for those with a higher relative income, and there is a strong rationale to expect individuals with a lower relative income to be more likely to transition into entrepreneurship than switch jobs.

An individual's income is an influential factor determining altitudinal and behavioral outcomes (Clark, Frijters, & Shields, 2006), with effects skewed towards the tails of the income distribution (Ferrer-i-Carbonell, 2005). Clark et al. (2006) suggest that individuals are likely to evaluate their income against the incomes of "people like me" who are similar in terms of age, education, or gender, the reference group. The income of the reference groups can be calculated using the average income of those with a similar education within a dataset. This is thus likely to create groups that are based either above average income or below average income. Thus, income creates a "bimodal" world where those at the lower end of the income distribution think and act differently from those at the higher end of the income distribution (Nikolaev & Wood, 2018).

An individual's relative income is likely to provide a good indicator of one's standing in the income distribution. Based on factors such as education and age, individuals are likely to compare their own income in reference to the average



income of “similar” people (Clark et al., 2006). A more refined understanding of relative income suggests that relative income functions like a double edge sword influencing an employee’s mobility decisions, where we expect those with higher relative incomes to act differently than those with lower relative incomes. The relative income position provides the individual with different informational cues as to how to understand the value of their productivity and the relative value of moving or staying with their current employer. Such different informational cues about one’s productivity relative to a similar other is likely to influence individual behavior (Clark et al., 2006). In an employment setting, such behavior is likely to be in terms of job separations leading towards mobility into entrepreneurship or a job switch (Andersson Joonas & Wadensjö, 2013).

Research on career mobility (e.g. Rider et al., 2019) suggests employees evaluate entrepreneurial career options relative not only to their current employer, but also to other employers. Comparing entrepreneurship to a job switch, the literature suggests entrepreneurship to be an activity involving risk and uncertainty (Koudstaal, Sloof, & Van Praag, 2015), and liability of newness (Freeman, Carroll, & Hannan, 1983; Yang & Aldrich, 2017), which is associated with liquidity constraints (Evans & Jovanovic, 1989). However, entrepreneurship is also portrayed as a path to higher income and autonomy (Benz, 2009; Shane, 2008), a source of social and economic mobility for individuals, and can act as a positive facilitator for upward mobility (Campbell, 2013; Campbell, Kryscynski, & Olson, 2017; Frid, Wyman, & Coffey, 2016; Hellmann, 2007; Lippmann, Davis, & Aldrich, 2005).

A lower relative income is likely to spur feeling of distributive injustice or relative deprivation. Employees with a lower relative income are likely to feel disappointed with their lower relative income and are also likely to perceive unfairness (Andersson Joonas & Wadensjö, 2013; Stark & Hyll, 2011; Werner et al., 2014; Zenger, 1994). Such individuals might hope that change in employers or moving into entrepreneurship might provide a higher income for their productivity, thereby suggesting increased turnover for employees with lower relative incomes. However, as incomes are tightly linked to the productivity of the focal individual (Becker, 1964; Weiss, 1995), a lower relative income is likely to suggest a lower ability to be competitive in the labor market. This low productivity is likely to provide limited opportunities for mobility and potentially increased income elsewhere, suggesting a lower turnover for a job switch.

Employees with a lower relative income develop upward social comparison making such employees more likely to undertake risky behavior such as starting a new venture (Aldrich & Ruef, 2006; Knight, 1921; Payne et al., 2017). Having lower incomes also implies lower opportunity costs of venturing into entrepreneurship (Amit, Muller & Cockburn, 1995) for employees with lower relative incomes compared to the ones with higher relative income. Åstebro, Chen, and Thompson (2011) suggest individuals are likely to earn lower wages due to possible frictions in the labor market where employees are not appropriately matched to their jobs and

such employees are likely to find self-employment as an attractive option over wage employment, making entrepreneurship an attractive option for upward mobility.

A higher relative income can be a great motivator, fuel ambition, bolster achievement (Isenberg, 2014), and reduce turnover by offering high returns to human capital (Pfeffer & Langton, 1988). Individuals with a higher relative income are likely to infer that the employer is rewarding the productivity of the employee in a fair way thereby suggesting decreased turnover for those with a higher relative income. A higher relative income is likely to lead individuals to feel satisfied with less, leading to risk averse behavior (Payne et al., 2017) and limits mobility, but if individuals with a higher relative income change, they are likely to prefer a less risky activity such as a job switch over entrepreneurship, because they know their relative productivity as employees, but not as entrepreneurs.

**Hypothesis 1a:** Individuals with (higher) lower relative income, relative to those with (lower) higher relative income are (less) more likely to choose entrepreneurship over job switch

Most occupational choice models understand mobility from employment to self-employment as an individual-level decision (Evans & Jovanovic, 1989; Kihlstrom & Laffont, 1979; Parker, 2005). These models focus on individual-level characteristics where the variation in human capital is the main explanation for mobility and entrepreneurship in particular (Lazear, 2005; Poschke, 2013; Wu & Knott, 2006; Åstebro et al., 2011). In its original form, human capital theory suggests that employees are rewarded for their productivity where employees who possess the same productivity receive exactly the same income. The human capital is the sole determinant of income. Lazear and Shaw (2009) describe this as a spot market view of the labor market, in which competition forces employees to be paid on the basis of their productivity, which is perfectly reflected by measurable skills.

However, markets are not efficient and labor market friction hinders labor mobility. Friction in the labor market where employees are not efficiently assigned to their jobs or tasks could influence an individual's choice of self-employment or employment. Employers differ in how they reward the value of their employees, where some skills are relatively more rewarded by some employers than by others, because these skills are specific to the employer. Hence, an employee can expect different rewards for the same productivity, because the employer values the underlying skill set differently. The determinants of labor market frictions are well documented in economics (e.g. Card, Cardoso, Heining, & Kline, 2018) and sociology (Mouw & Kalleberg, 2010), but the effects of these frictions on self-employment entry are currently unknown (Åstebro et al., 2011).

One important labor market feature is the division of labor that arranges employees into positions based on organizational ranks (Weber, 1922) where individuals are grouped based on similar skill sets (Blau, 1970). The division of labor based on the

categories suggests that employees have different responsibilities (Weber, 1922). Mintzberg (1980) suggests that employees can be broadly categorized as managers (strategic apex and middle line) and non-managers (operating core). Research suggests managers are likely to have more generic skills such as leadership, administration and team management, while non-managers are likely to have more technical skills that involve specialization in a particular type of an activity (Katz, 2009)

Therefore, being endowed with skills that are generic in nature and due to upward social comparisons with managers earning higher relative incomes, managers with lower relative incomes are more likely to move into entrepreneurship than non-managers.

**Hypothesis 1b:** The propensity for mobility into entrepreneurship versus an alternate job is higher for managers with lower relative incomes than for non-managers with lower relative incomes.

## **Relative Incomes, Entry Size and Returns from Entrepreneurship**

Entrepreneurship is seldom a lone endeavor and a significant share of startups involve more than one individual (e.g. Aldrich, Carter, & Ruef, 2002), especially in the knowledge intensive sector. The complexity of knowledge-intensive startups is likely to make entrepreneurs vie for additional human resources in terms of team members that are needed for technological and market expertise. At the entry stage the team characteristics and size can have an influence on future performance such as survival and growth (Eisenhardt & Schoonhoven, 1990; Shah, Agarwal, & Echambadi, 2019).

Research in entrepreneurship has focused on how the prior employment characteristics of entrepreneurs influence initial strategy, obtaining finance and entry size (Burton, Sørensen, & Beckman, 2002; Colombo, Delmastro, & Grilli, 2004). As income is an indicator of individual productivity, employees with lower relative incomes are more likely to need additional human resources possibly in terms of co-founders, and financial resources for starting a new venture or even for future growth of the new venture. Capital is a necessary and an important element not just for starting the business (Evans & Jovanovic, 1989) but also for firm growth and survival (Cooper, Gimeno-Gascon, & Woo, 1994).

However, income inequality is likely to endow employees with differential access to resources and opportunities. Liquidity constraints restrict individuals to devoting less capital to entrepreneurship (Evans & Jovanovic, 1989; Holtz-Eakin, Joulfaian, & Rosen, 1994; Hurst & Lusardi, 2004). Individuals with lower capital levels are faced with hurdles such as limited external borrowing of funds (Gavin, 2004) or use their income as collateral to access credit markets (Frid et al., 2016). Employees

with lower relative incomes, compared to employees with higher relative income, are likely to have more limited financial resources limiting their ability to hire additional human resources, which is likely to influence the size on entrepreneurial entry.

Furthermore, employees with a higher relative income are also likely to have signaling effects (Weiss, 1995) that could potentially attract future investors. Such employees are also more likely to have higher opportunity costs (Amit, Muller, & Cockburn, 1995) and hence may possibly prefer additional resources to perform better in entrepreneurship.

In summary, employees with a higher relative income, than those with a lower relative income, are likely to have a higher entry size on entry into entrepreneurship.

**Hypothesis 2:** The propensity to enter entrepreneurship with a larger entry size is higher for those employees with higher relative income than for those with lower relative income.

While entrepreneurship might shine as a beacon to increased income for those less rewarded for their work, the reality might be that those that did well as employees will also do well as entrepreneurs. Income inequality is an organizational characteristic largely driven by the unequal provision of remuneration and rewards to employees. Firms provide individuals with varying incomes based on parameters such as education, work performance and ability (Williamson, 1995).

This differential provision on incomes endows employees with varying access to opportunities, different sources of capital and resources needed to start and execute new ventures. Employees earning relatively higher intuitively have better access to resources than employees with a lower relative income. High performing employees in income employment are like to be better performers in entrepreneurship (Elfenbein et al., 2010). As income is an indicator of performance, higher performance in income employment implies higher incomes in income employment and therefore higher returns in entrepreneurship.

**Hypothesis 3:** Employees with higher relative income are likely to obtain higher returns from entrepreneurship than employees with lower relative income.

## Methods and Data

**Constructing the Sample:** We investigate how relative income influences employees in their mobility decisions – entrepreneurship versus a job switch. To test our hypotheses, we use a linked employer-employee register provided by Statistics Sweden from 1990-2008 to construct a sample of STLF individuals with

(a) new jobs in 2001<sup>5</sup> (b) with no entrepreneurial experience between 1990 and 2001 (c) 22<sup>6</sup> years of age and above in 2001 but less than or equal to 60 in 2008. This corresponds to 264,084 observations for 2001-2008. We restrict our sample to individuals with no prior entrepreneurial experience, as such experience can influence future decisions to venture into entrepreneurship (Sørensen, 2007). Additionally, a new job in 2001 ensured that these individuals had no prior experience in the focal firm enabling analysis of similar employees (Burton, Dahl, & Sorenson, 2017) and also avoids bias due to left censoring (Yang & Aldrich, 2012).

We focus on income from wage employment to restrict to individuals with employment status code “2” (YrkStalln) in the dataset, resulting in a sample of 249,112 observations. A focus on STLFI individuals with income from wages allows us to focus on a homogenous sample with a similar education and income source. Our data have missing information on organization identifiers (3,881 observations) and occupational codes (3,680 observations). We drop such observations with missing information. Furthermore, we follow Andersson Joona and Wadensjö (2013) by excluding those earning an annual income of less than 156,000 SEK (12,974 observations) which corresponds to a monthly income of 13,500 SEK. This corresponds to the lowest income in the collective agreement organized by the major labor union, LO (Andersson Joona & Wadensjö, 2013). This results in a sample (an unbalanced panel) of 228,577 observations for 2001-2008. We make a closer examination of panel data (xtdescribe in Stata) and observe that more than 60% of the panel had observations for all 8 years (balanced) and approximately 10% of the panel had observations for 7 years. This suggests that the panel is fairly balanced for more than 70% of the sample. Additionally, we also note that this sample size is significantly smaller than that of Andersson Joona and Wadensjö (2013) who had 1,104,953 individuals for 2001. Our smaller sample size can be attributed to the restricted sample of STLFI individuals.

## Constructing the Variables

### *Dependent variables*

*Employee mobility:* The dependent variable to test hypotheses 1a and 1b is employee mobility. This variable is coded “1” for mobility into incorporated entrepreneurship and “2” for a job switch. The variable is coded “0” for employees who remain in wage employment. We follow recent debates on who can be considered an entrepreneur (see Henrekson & Sanandaji, 2014; Levine & Rubinstein, 2017) to investigate our hypothesis using a stricter definition of entrepreneurship. We focus

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<sup>5</sup> We restrict the sample from 2001 as occupation codes (SSYK) are available only from 2001.

<sup>6</sup> This is the minimum age in our sample of STLFI graduates and above

on the corporate form of entrepreneurship by restricting our analysis to individuals moving into incorporated entrepreneurship. Although employees can enter into self-employment by either starting an unincorporated or incorporated firm, this study focuses on mobility into incorporated entrepreneurship. Incorporated entrepreneurship requires skills such as creativity, analytical thinking and higher education (Levine & Rubinstein, 2017). Our sample of highly educated STLF individuals is likely to have a higher ability and also demonstrate more transitions into incorporate entrepreneurship than mere self-employment, making incorporated entrepreneurship a better proxy for this study.

*Entry size:* The dependent variable to test hypothesis 2 is entry size, which is calculated based on the total number of employees in the organization at time  $t+1$ . The total number includes all the employees including the founders.

*Returns from entrepreneurship:* The dependent variable to test hypothesis 3 is the initial returns from entrepreneurship. We use the (log) pay received during the first year of entrepreneurship as subsequent incomes are likely to be influenced by entrepreneurial skills rather than skills gained during income employment (Marx & Timmermans, 2017).

#### *Independent variables*

*Relative Income:* The key independent variable of this study is the relative income that separates individuals into a bimodal, which helps identify individuals with a lower relative wage and a higher relative wage. To identify the two groups, we follow prior research to identify a two-step strategy to categorize such individuals into the two groups.

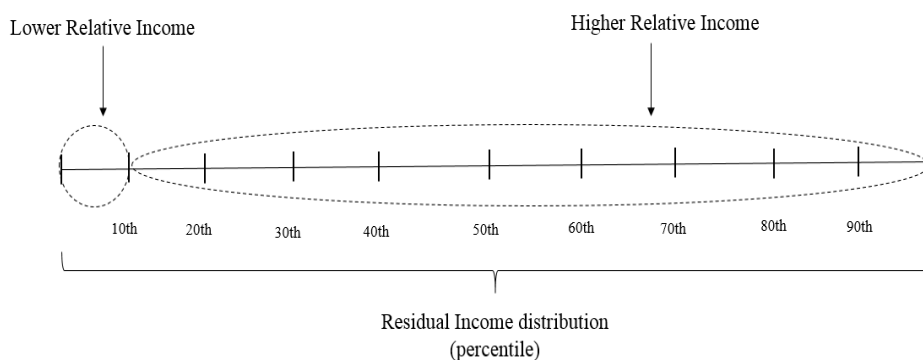
In the first step, we use the residual form of income regression as an indicator of those who earn below or above average. Such a technique of using the residual form of income regression has been used in prior studies to identify mobility of employees into a job switch or self-employment (e.g. Andersson Joona & Wadensjö, 2013; Gielen & van Ours, 2006). Following this approach, we perform an income regression using OLS with a large set of covariates<sup>7</sup>. We then follow this by deriving the residual incomes that measures the difference between the actual incomes an employee receives and the average income employees with similar observable characteristics receive. Average income also indicates predicted earnings, i.e. an income an individual would receive in a similar job given the individual and firm characteristics. The difference between the actual income and

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<sup>7</sup> We follow Andersson Joona & Wadensjö (2013) to include the following covariates: age (8 cohorts), marital status (married/others), #children, children under six, organizational tenure, total wage experience, firm size (4 categories), sector (2 categories), occupations (49 categories) and industries (14 categories). Additionally, we use gender (male/female), organizational rank (managers/non-managers), (Scientist/Technologist/Engineers/Mathematicians), PhD, Stockholm commune. Appendix I presents the outcome of the income regression.

average income indicates the deviation from predicted earnings. The bigger the deviation from predicted earnings, the higher (lower) the individual's income is relative to his or her peers. A negative residual income indicates that the individual receives a lower income than the income that comparable employees make on average, while a positive residual indicates that the individual receives a higher income than similar employees make on average. Once we obtain the residual incomes, we generate a percentile distribution of the residual income (pctile STATA command). This appropriately captures the relative position of an employee in the income distribution by identifying individuals at each of the 10 deciles in the residual income distribution. Once the individuals are identified at each decile of the residual incomes, we follow this up with a second step to determine an appropriate cut-off level to categorize individuals into two categories – those with relatively lower income and those with relatively higher income.

Specifically, in the second step, we determine the cut-off level by performing a detailed analysis of the residual income distribution from our data. In figure 2 (page 24) of the descriptive analysis, we observe that in our data, employees at the extreme ends of the distribution are more likely to venture into entrepreneurship than switch jobs – suggesting a U shaped relationship between income and mobility (Andersson Joona & Wadensjö, 2013; Åstebro et al., 2011). However a closer examination suggests the individuals placed below the 10<sup>th</sup> percentile of the residual income distribution are the most likely to opt for entrepreneurship relative to a job switch. Using this information, we formally define the relative income. The relative income (*Relative Income (Bottom 10)*) is coded “1” for employees who are below the 10<sup>th</sup> percentile of the residual income distribution and coded “0” otherwise. Figure 1 presents the graphical representation of the overall idea of separating individuals into percentiles with higher and lower relative incomes.



**Figure 1**  
Relative Incomes

*Managers:* To capture organizational rank, we follow Tåg, Åstebro, and Thompson (2016) to use the occupational codes provided by Statistics Sweden to categorize employees as managers (CEOs, senior staff & managers) and non-managers (supervisors and production workers). This variable captures the organizational rank of the focal employee. This variable is coded “1” for managers and “0” for non-managers.

### *Controls*

We control for *Age*: This captures an individual’s age upon entry into entrepreneurship. We use categorical indicators (16-25, 26-30, 31-35, 36-40, 41-45, 46-50, 50-55, 55+) instead of a continuous to capture the non-linear effects of age on mobility. The omitted category is ages 16 to 25, against which a comparison is made. *Gender*: Prior research documents suggested that it was rarer for women to transition into entrepreneurship than men. Gender is coded “1” for man and “0” for woman. *Number of Children*: A count variable indicating the number of dependent children belonging to the focal individual. *Number of Kids Under six*: A count variable indicating the number of kids under the age of 6. *Firm tenure* implies valuable firm-specific knowledge that determines employee incomes (Lazear, 2004). *Total work experience* is a form of general human capital that is correlated with knowledge and expertise (Neal, 1995). *Sum of job changes*: As prior job hops are likely to effect the transitions into entrepreneurship (Åstebro et al., 2011), we include total number of job changes undertaken by the employee. *Firm size* is divided into three categories: 01-50, 51-250, 251-500, and 501+ employees. Entering categorical dummies provides a better picture of the response variable at various categories of the organizational size (Balachandran et al, 2014). The omitted category is firms with 1-50 employees. *STEM*: a categorical variable to obtain effects for scientists (1), technologists (2), engineers (3), and mathematicians (4), *PhD*: to capture the effects of having a PhD within the STLF and the *Stockholm commune*. *Firm tenure* is a form of general human capital that is correlated with knowledge and expertise (Neal, 1995). *Sector*: Using the sector code provided by Statistics Sweden, this variable is coded “1” for business enterprises that are not state owned (Sector code “21”) and “0” otherwise. *Occupational fixed effects*: This variable captures the occupation of the focal employee. *Industry Fixed Effects*: Industry dummies created to control for industry level heterogeneity. *Year*: Year fixed effects are added to control for other macro level unobserved changes in the society.

### *Descriptive Analyses*

Table 1 presents the sample means for 2002-2008 for (1) employees who remain in current employment during the study period (2) transitions into incorporated entrepreneurship, (3) transitions into a different job during the study period and (4) transitions into mere self-employment.



**Table 1**  
Sample means (2002-2008)

Covariates measured 2002-2008	Remained in the current firm	Incorporated Entrepreneurship	Job Switch	Self-Employment
Employment Status Share (%)	83.27	1.03	15.69	0.41
Age (years)	39.05	40.17	37.38	39.94
16-25 (% share)	0.81	0.00	0.23	0.00
26-30	11.55	0.12	3.04	0.05
31-35	20.30	0.22	4.20	0.09
36-40	17.77	0.21	3.25	0.08
41-45	13.84	0.18	2.28	0.08
46-50	9.83	0.15	1.57	0.06
51-55	6.80	0.12	0.93	0.04
56+	2.38	0.02	0.20	0.01
Scientists	16.75	0.23	2.77	0.08
Technologists	11.71	0.19	2.80	0.06
Engineers	48.06	0.55	9.04	0.23
Mathematicians	6.75	0.05	1.07	0.31
Female	23.32	0.18	4.09	0.08
Male	59.94	0.85	11.59	0.32
Sector (non-state owned)*	59.29	0.97	12.39	0.32
Sector (state owned)	23.99	0.06	3.31	0.09
Non-managers	73.97	0.86	14.11	0.36
Managers	9.30	0.17	1.59	0.05
Firm Size 1-50	14.96	0.74	3.95	0.16
Firm Size 51-250	0.10	0.10	3.44	0.08
Firm Size 251-500	6.94	0.02	1.45	0.03
Firm Size 501+	46.78	0.17	6.86	0.14
Residual Income	0.00	-0.03	-0.01	-0.09
(Std. Dev)	(0.31)	(0.39)	(0.32)	(0.39)
Above 20	16.41	0.28	3.31	0.13
Bottom 20	66.86	0.76	12.38	0.28
Income (,00 SEK)	4800	5026	4628	4592
(Std. Dev)	(3047)	(3130)	(3289)	(2612)

\*Non-state owned are identified by sector code 21, while the other codes are identified as state-owned

A comparison of workers who remained in their current jobs with those who move into incorporated entrepreneurship or self-employment, suggests that a significant share (83%) of employees remained in current employment, 15.69% transitioned for a job switch, while 1% transitioned into incorporated entrepreneurship and 0.41% transitioned into self-employment. We note here that the percentage of transitions into entrepreneurship (1.41% in total including incorporated entrepreneurship and self-employment) is higher than that reported in Andersson Joona and Wadensjö (2013) who reported 0.9% of employees moving into self-employment for Swedish male wage earners for 2001-2002. Another important observation to note here is that the percentage of transitions into self-employment is lower (0.41%) than for incorporated entrepreneurship (1%). This observation is at odds with Tåg et al. (2016) who report a higher percentage of transitions into self-employment among the general population.

A comparison of the residual incomes of the employees who remain in paid employment to those who move, either into incorporated entrepreneurship or a different job or into self-employment, suggests that employees with negative residual incomes are more likely to undertake all three types of transitions. This observation is at odds with Andersson Joona and Wadensjö (2013: 170) who suggested that employees with positive residual incomes were more likely to move into self-employment or a different job. A possible explanation for this difference could be the higher upward social comparison effects to the highly skilled workforce who have higher mobility options in the labor market (Xie, Fang, & Shauman, 2015). We also note the higher mean income of employees who transition into incorporated entrepreneurship is 502,600 SEK per annum, a number higher than that reported in Andersson Joona and Wadensjö (2013). A comparison of employee age means suggests that those employees who moved into incorporated entrepreneurship were around 41 years old, the number is similar to that reported in Andersson Joona and Wadensjö (2013) who reported an average age of 39.1 years for self-employed individuals in 2002.

As the study includes occupation and industry in the income regression, Tables 2 and 3 illustrate the five most common occupations for those who remained in their jobs and those who moved into incorporated entrepreneurship during the study period. A notable observation is that a significant share of employees (~50%) remained in paid employment, and those who moved into entrepreneurship were architecture, engineering, computing and healthcare professionals. Tables 4 and 5 list the five most common industries for employees who remained in current employment and those who move into incorporated entrepreneurship. We find that about 70% of the employees are concentrated around the industries related to professional and technical services, healthcare and education. The observation about the top five occupations and industries is at odds with Andersson Joona and Wadensjö (2013) who observe significantly smaller shares in the top occupations and industries. Specifically, for occupations, they observed that 7.1% (highest

share) of the employees who remained in wage employment in 2001 were physical and engineering science technicians, while 7.5% (highest share) of the employees who became self-employed in 2002 were finance and sales associate professionals. For industries, they observed that 2.2% (highest share) of the employees that remained in wage employed belonged to the software consultancy and supply industry, while 8.5% (highest share) of the employees who became self-employed in 2002 belonged to the software consultancy and supply industry.

In general, a plausible explanation for the differences in the observations with the prior studies could be attributed to our highly educated STLF individuals. Levine and Rubinstein (2017) suggested that incorporated entrepreneurship requires higher cognitive skills such as creativity and analytical skills and those who transition into it also likely to be more educated, thus providing a plausible explanation to this observation given the fact that our study focuses on highly educated STLF employees.

**Table 2**

Top 5 occupations (2002-2008) among those who stayed employed in the same firm

Occupation	Share (%)
Architects, engineers and related professionals	20.91
Computing professionals	19.01
Physical and Engineering science technicians	9.88
Health professionals (except nursing)	9.57
Other specialist managers	5.96

**Table 3**

Top 5 occupations (2002-2008) among those who ventured into incorporated entrepreneurship

Occupation	Share (%)
Computing professionals	28.66
Architects, engineers and related professionals	16.70
Health professionals (except nursing)	15.52
Managers of small enterprises	6.06
Business professionals	5.85

**Table 4**

Top 5 Industries (2002-2008) among those who stayed employed in the same firm

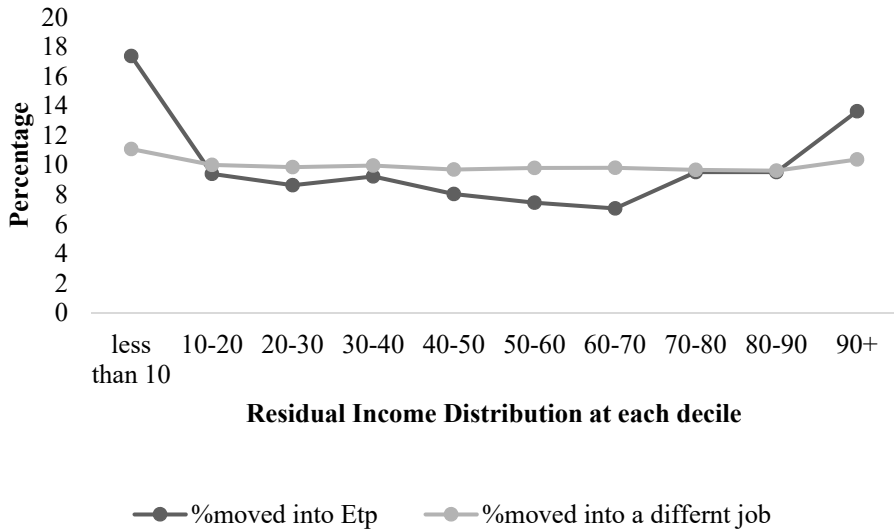
Industry	Share (%)
Professional, scientific and technical activities	37.60
Manufacturing	25.22
Education	10.44
Transportation and storage	5.93
Veterinary activities	5.52

**Table 5**

Top 5 industries (2002-2008) among those who ventured into incorporated entrepreneurship

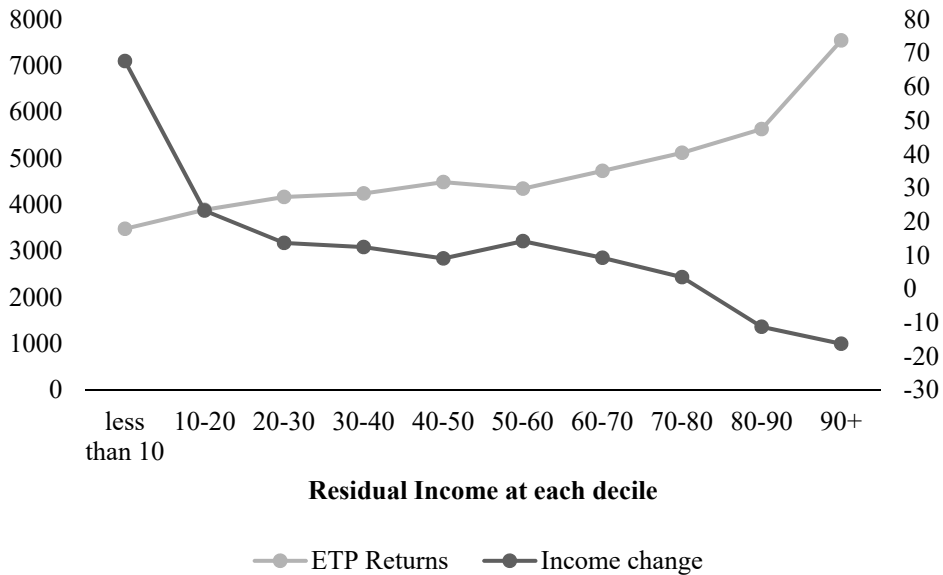
Industry	Share (%)
Professional, scientific and technical activities	65.15
Education	14.67
Transportation and storage	6.66
Manufacturing	5.77
Wholesale and retail trade	1.44

The focus of this paper is to investigate the relationship between relative incomes and mobility into incorporated entrepreneurship, compared to a job switch. Figure 2 describes the relation graphically. The graph explains the mobility patterns of individuals at each decile of the residual income distribution. For example, during the study period of 2002-2008, of the individuals who move into incorporated entrepreneurship, 17.93% have incomes below the 10<sup>th</sup> percentile of the residual wage distribution. Similarly, of the individuals who switch jobs, 11.09% have incomes below the 10<sup>th</sup> percentile of the residual income distribution. Although, the distribution suggests a U-shaped relationship (i.e. Employees at the extreme ends of the distribution are more likely to venture into entrepreneurship) a closer examination suggests the individuals placed below the 10<sup>th</sup> percentile of the residual income distribution are the most likely to opt for entrepreneurship compared to a job switch.



**Figure 2**  
Percentile of the residual distribution 2002-2008

Figure 3 presents the graphic relationship between the residual incomes and returns from entrepreneurship. We observe that the employees placed below the 10<sup>th</sup> percentile of the residual income distribution have lower returns from entrepreneurship (in terms of absolute incomes) while this increases for employees towards the 90<sup>th</sup> percentile of the residual distribution. However, in terms of percentage change in income over the previous ( $t-1$ ) income in income employment, we observe the opposite effect. Employees below the 10<sup>th</sup> percentile of the residual income distribution have a positive change (+70%) in income over the last income in income employment while the change is negative (-20%) for employees placed at the top decile of the residual income distribution.



**Figure 3**  
Returns from entrepreneurship 2002-2008

To help identify patterns in our data that ensures isolation of the relative income and absolute income, we illustrate the correlation between the residual and income distribution in Table 6. A high correlation between the residual and the income is likely to suggest that the effect on mobility is more due to absolute incomes than relative incomes. In Table 6 we present the correlations between the residual and income distribution. Specifically, cell row 1 and column 1 (51.05%) represent the correlation between income earners in the first decile of the residual distribution and income distribution. Among the income earners in the first decile, 51% belong to the first decile of the residual distribution. The concentration is highest (57%) in the top decile of the residual and income distribution. The distributions are correlated to a certain extent but not to an extent large enough to be observed in the diagonal cells that have a relatively low concentration, thereby suggesting overall that relative incomes were unlikely to be correlated to absolute incomes.

**Table 6**

Correlation between the deciles of the residual distribution and the deciles of income distribution

Deciles of residual distribution	Deciles of income distribution									
	1	2	3	4	5	6	7	8	9	10
1	51.05	19.50	10.19	6.83	4.62	3.42	2.22	1.47	0.65	0.04
2	51.20	20.90	17.83	12.87	9.79	7.50	5.86	4.21	2.46	0.49
3	10.20	15.44	16.58	16.39	13.28	10.19	8.04	5.88	3.19	0.80
4	6.74	11.90	13.76	14.78	15.25	13.50	11.09	7.54	4.45	0.98
5	4.80	9.90	11.43	12.68	13.65	14.60	14.02	10.75	6.44	1.74
6	3.05	7.91	10.17	11.13	12.42	13.27	14.40	14.11	10.67	2.86
7	2.16	6.23	8.17	10.15	11.46	12.85	13.76	15.45	14.33	5.44
8	1.74	4.60	6.59	8.03	10.03	12.02	13.47	15.40	17.89	10.22
9	1.54	2.40	3.97	5.35	6.89	9.13	11.45	16.32	22.29	20.66
10	0.56	1.20	131.26	1.79	2.62	3.52	5.70	8.87	17.65	56.78

No. of observations: 228,577

## Results

### Hypothesis Testing

Table 7 presents the descriptive statistics and the bivariate correlations for the entire list of variables used in the study. In addition to the dependent and independent variables used in the study, Table 7 lists the various controls used in the regression models.

**Table 7**  
Descriptive information and bivariate correlations

	Mean	SD	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) Mobility	0.32	0.73	0	2	1.00														
(2) Below 10	0.10	0.30	0	1	0.01	1.00													
(3) Age groups	3.16	1.63	0	7	-0.07	0.06	1.00												
(4) Gender (Male)	0.72	0.45	0	1	0.02	-0.01	0.05	1.00											
(5) Married	0.52	0.50	0	1	-0.03	0.05	0.32	0.04	1.00										
(6) Children	1.12	1.12	0	12	-0.04	0.06	0.29	0.02	0.51	1.00									
(7) Kids Under 6	0.49	0.77	0	4	-0.01	0.04	-0.16	0.04	0.28	0.52	1.00								
(8) Firm Tenure	3.00	1.98	1	8	-0.12	-0.00	0.22	-0.02	0.09	0.10	0.05	1.00							
(9) Occupation Rank	0.11	0.31	0	1	-0.01	0.07	0.18	0.08	0.14	0.14	0.01	0.03	1.00						
(10) Sum Job Change	3.13	1.68	1	15	0.02	0.04	0.25	0.04	0.12	0.15	0.06	-0.17	0.10	1.00					
(11) Total Work Exp.	9.16	4.68	0	18	-0.09	0.04	0.64	0.05	0.28	0.30	-0.00+	0.34	0.20	0.37	1.00				
(12) Firm Size	2.96	1.23	1	4	-0.10	-0.04	0.07	-0.08	0.03	0.03	0.01	0.13	-0.07	-0.07	0.08	1.00			
(13) Stockholm	0.20	0.40	0	1	0.03	0.01	-0.05	-0.04	-0.12	-0.15	-0.08	-0.05	-0.03	0.03	-0.05	-0.06	1.00		
(14) PhD.	0.09	0.28	0	1	-0.03	0.01	0.16	-0.00+	0.08	0.08	0.00+	0.05	-0.01	-0.01	0.13	0.07	-0.00	1.00	
(15) STEM	2.54	0.90	1	4	-0.00+	-0.01	-0.01	0.20	0.02	-0.01	0.00+	-0.01	0.11	-0.02	0.01	-0.09	-0.00	-0.12	1.00

No of observations: 228,577; All correlations are supported at  $p < 0.05$ ,  $p < 0.01$ ,  $p < 0.001$  except those indicated by +;



## Employee Mobility

Table 9 reports the multinomial regression that tests the relationship between relative incomes and mobility into incorporated entrepreneurship versus a job switch. We also conduct Chi-square tests of equality of coefficients for the two different outcomes to demonstrate the effect of each independent variable and how they potentially differ between the outcome variable of mobility into incorporate entrepreneurship versus job switch (Freese & Long, 2000).

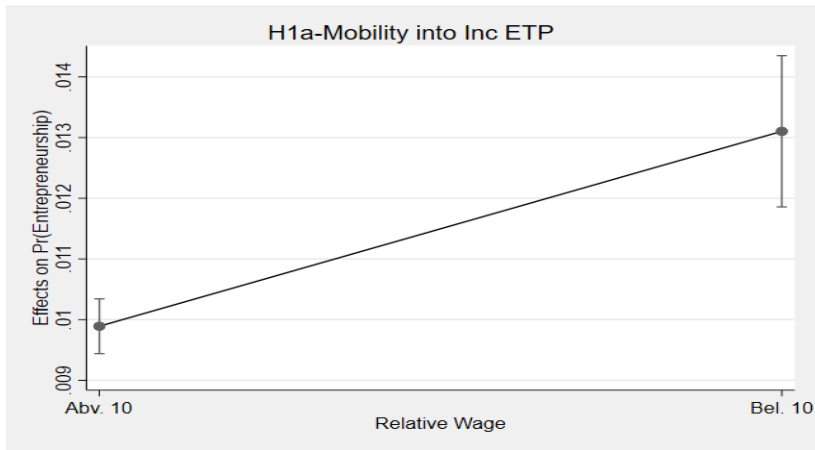
**Table 9**  
Main results (H1a and H1b)

	Mobility (1)		Mobility (2)	
	Incorporated Entrepreneurship	Job Switch	Incorporated Entrepreneurship	Job Switch
Bottom 10	0.34***(0.06)	0.14***(0.02)	0.29***(0.07)	0.16***(0.02)
Bottom 10 ## Managers			0.22 (0.14)	-0.13*(0.05)
Observations	228,577		228,577	

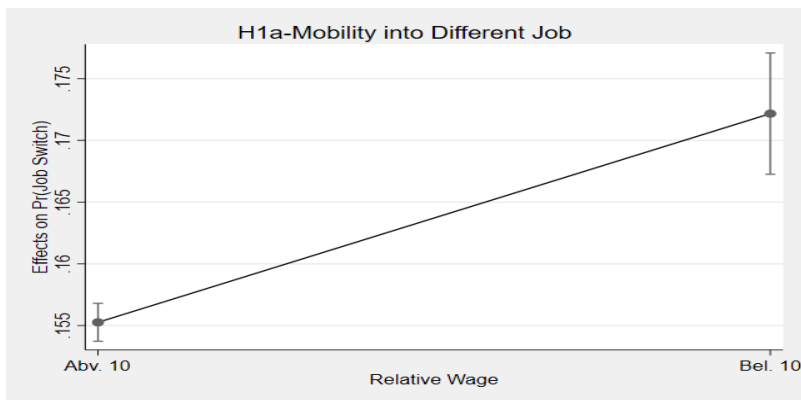
The controls include Age (categories), Gender, Marital Status, #children, Children under six, Firm tenure, total tenure, Manager (yes/no), Sum of job changes, Firm Size (categories), Stockholm commune, Industry dummies, year dummies, sector dummy. Clustered standard errors are in parenthesis. \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

Models 1 and 2 serve as full models including controls to test hypotheses 1a and 1b. Hypothesis 1a predicts that compared to the employees with a higher relative income, employees with a lower relative income are more likely to venture into entrepreneurship than switch jobs. The results of Model 1 suggest that the employees with a lower relative income, compared to those with higher relative income are more likely to enter entrepreneurship than switch jobs. The omitted category is the employees with relative incomes above the 10<sup>th</sup> percentile of the residual distribution. The coefficient for mobility into entrepreneurship is 0.34 ( $p < 0.001$ ) while the coefficient for a job switch is 0.14 ( $p < 0.001$ ). The Chi-square tests (Chi2) of equality of coefficients for the two different outcomes is 11.19 ( $p < 0.001$ ). To dig deeper, we present the margins plot to estimate the predicted probabilities of transitions in entrepreneurship versus a job switch. Figure 4 shows the predicted probabilities for mobility into entrepreneurship for employees below the 10<sup>th</sup> percentile and employees above the 10<sup>th</sup> percentile. The figure implies that the probability of mobility into entrepreneurship increases from 0.01 for employees above the 10<sup>th</sup> percentile to 0.013 for employees below the 10<sup>th</sup> percentile. Similarly, Figure 5 shows the predicted probabilities for a job switch for employees below the 10<sup>th</sup> percentile and employees above the 10<sup>th</sup> percentile. The figure implies that the probability of mobility for a job switch increases from 0.155 for employees above

the 10<sup>th</sup> percentile to 0.175 for employees below the 10<sup>th</sup> percentile. Overall, the results support hypothesis 1a.



**Figure 4**  
Predicted probability for mobility into entrepreneurship



**Figure 5**  
Predicted probability for a job switch

The above results also suggest that mobility is likely to decrease for those above the 10<sup>th</sup> percentile, and the effect is likely to be more for entrepreneurship than a job switch. Overall, the results confirm hypothesis 1a.

Hypothesis 1b predicts that managers with a lower relative income are more likely to venture into entrepreneurship over a job switch than non-managers. The results of Model 2 in Table 9 indicate that the coefficient for mobility into entrepreneurship for managers with lower relative incomes is positive (0.22; n.s) while the coefficient

for a job switch is negative (-0.13;  $p < 0.5$ ). The Chi-square tests (Chi2) of equality of coefficients for the two different outcomes is 6.22 ( $p < 0.05$ ). In general, the non-significance of the result does not provide support for our hypothesis, thereby rejecting hypothesis 1b.

## Entry Size and Returns from Entrepreneurship

Hypothesis 2 predicts that employees with lower relative incomes are likely to have a smaller entry, than those with higher relative incomes. The results in Table 10 (Model 1) indicate that the coefficient for entry size for those with relatively lower incomes is negative and significant (-0.42;  $p < 0.001$ ). This provides support to hypothesis 2. Specifically, our results indicate that those with a lower relative income are likely to have an entry size that is on average 42% smaller than the entry size for those above relative income. Our result suggests that individuals with a higher relative income are more likely to depend on additional human resources such as cofounders, which are likely to increase the entry size on entering entrepreneurship.

Hypothesis 3 predicts that employees with higher relative incomes are likely to have higher returns from entrepreneurship than those with lower relative incomes. The results in Table 10 (Model 2) indicate that the coefficient for returns from entrepreneurship is negative and significant (-0.44;  $p < 0.001$ ). This confirms hypothesis 3. Specifically, our results indicate that those with a lower relative income are likely to have an initial income that is on average 47% lower than the initial income of those above relative income.

**Table 10**  
Main results (H2, H3)

	Entry Size (1)	Returns to ETP (2)
Omitted category (Above 10)		
Bottom 10	-0.42*** (0.10)	-0.47*** (0.06)
Observations	2,359	2,359

The controls include Age (categories), Gender, Marital Status, #children, Children under six, Firm tenure, total tenure, Manager (yes/no), Sum of job changes, Firm Size (categories), Stockholm commune, Industry dummies, year dummies, sector dummy. Clustered standard errors are in parenthesis. \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

Overall, our results indicate that employees with lower relative incomes are more likely to move into entrepreneurship than those with higher relative incomes. However, those with lower relative incomes demonstrate lower initial performance and entry size when venturing into entrepreneurship.

**Robustness Check:** We include the following robustness checks to examine the fragility of our results and to diagnose any misspecifications of the coefficient

estimates. Despite our inclusion of a number of controls in the income regression, we observe an R-squared of nearly 50%, which means that nearly 50% of the variation in incomes remains unexplained. Unobserved heterogeneity is a potential problem due to unobservable factors at the individual level and firm level. At the individual level, the unobservable could be in terms of traits such as preferences for risk, personality features or ability. At the firm level, spurious effects of workplace characteristics might influence entrepreneurial entry if an individual self-selects to work in firms that are entrepreneurial firm (Sørensen, 2007).

To address any bias induced due to fixed (stable over time) unobserved individual level variables, we used fixed effects methods, which is a standard method to address this concern. However, the inclusion of fixed effect estimations comes with two limitations (Sørensen, 2007). First, because an estimation of individual fixed effects requires that the dependent variable vary within individuals, it results in a drop of individuals who do not have any change in their occupation status over the years of study. That is, those individuals who have remained in their current jobs over the years of the study period. This restriction needs to be considered while interpreting the results. Second, within-person models rely on between firm variations that may in turn be correlated with other unobservable factors, like corporate culture or firm promotion policies.

We follow Kacperczyk and Balachandran (2018) to use a matching technique to rule out the concern of unobserved heterogeneity affecting our main results. We construct a treatment dummy for individuals placed below the 10<sup>th</sup> percentile of the relative income distribution. Next, using Entropy Balancing (Hainmueller, 2012) as the matching technique, we create a balanced sample of employees who are likely to venture into entrepreneurship and those that likely to remain in income employed using the same control variables used in the main income regression. Once we obtain the balanced sample, we execute a logistical regression using the weights provided by the matching algorithm.

Table 11 estimates the main models using the logistic regression with the treated dummy. The results in column (1) confirm the main results.

**Table 11**  
Logistic regression using Entropy Balancing (EB)

	Mobility into Inc. Entrepreneurship
Treated (Bottom 10)	0.15*** (0.02)
Observations	200,387

The controls include Age, Gender, Marital Status, #children, Children under six, Firm tenure, total tenure, Manager (yes/no), Sum of job changes, Firm Size (categories), Stockholm commune, Industry dummies, year dummies, sector dummy. Clustered standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

## Discussion

We investigated how income inequality, identified by an employee's relative income affects his/her propensity to transition into entrepreneurship versus a job switch and how this relationship is moderated by the employee's rank. We argue that through social comparison, employees compare themselves with employees with similar characteristics where relative income acts as a double-edged sword depending on the employee's location in the income distribution. Additionally, we investigate how the relative income of an employee influences entry size and returns from entrepreneurship. We contribute to existing research in three important ways.

First, research suggests that individuals care about their relative position in society. How much better or worse one is, relative to others is likely to influence outcomes such as life satisfaction, happiness, increased risk taking, higher crime rates, increased debt and poorer health, partly through the processes of social comparison (e.g. Cheung & Lucas, 2016; Clark et al., 2008; Payne et al., 2017; Tsui, 2014). We extend this understanding into entrepreneurship research (e.g. Nikolaev & Wood, 2018; Werner et al., 2014) by using social comparison as the key mechanism to investigate how an individual's relative income influences mobility into entrepreneurship compared to a job switch. Our results confirm our understanding in entrepreneurship research that entrepreneurs are drawn from the tails of the ability and income distribution in Sweden as well as in South Korea (e.g. Andersson Joona & Wadensjö, 2013; Åstebro et al., 2011). Additionally, prior research in entrepreneurship suggests that although people at the lower end of the income distribution are more likely to develop positive intentions towards self-employment (Werner et al., 2014), it is only those at the upper end of the distribution that are more likely to choose self-employment (Nikolaev & Wood, 2018). Using a sample of U.S. General Social Survey, Nikolaev and Wood (2018) investigate how an individuals' relative position in the income distribution moderates the relationship between the proportion of entrepreneurs in a regional cohort, the individual's attitude and the likelihood of choosing self-employment. They find that through social comparison, individuals at the lower end (below the 20<sup>th</sup> percentile of the relative income distribution) of the income distribution are more likely to develop positive attitudes towards self-employment, while those at the upper end of the distribution (above the 20<sup>th</sup> percentile) are more likely to choose self-employment. Our results indicate that through the process of social comparison, employees with significantly lower relative incomes are more likely to venture into entrepreneurship than employees with higher relative incomes. Our results indicate strong social comparison effects for those with a lower relative income that increases turnover, more for entrepreneurship than a job switch. Our findings suggest that inequality in income is likely to make individuals who are paid relatively less to undertake risk taking activity such as entrepreneurship.

In general, the literature on entrepreneurship recognizes that financial capital is an important element in starting a business. Liquidity constraints (Evans & Jovanovic, 1989) tend to ignore those with limited funds at their disposal. Venturing into entrepreneurship requires substantial initial investment, which is likely to discourage individuals with lower relative incomes from venturing into entrepreneurship. Our sample of highly educated engineers and scientist has higher incomes than generic samples in other studies. Our mean income of 502,600 SEK (313,000 SEK standard deviation) per year is higher than that given in Andersson Joona and Wadensjö (2013) study, who used a mean income of 357,162 SEK per year (271,056 standard deviation). This indicates that our sample earns higher incomes on average and is thus likely to have a better liquidity than a generic sample, thereby increasing their likelihood of venturing into entrepreneurship. Additionally, Killewald, Pfeffer, and Schachner (2017) suggested that individuals with high levels of education are also associated with greater wealth accumulation having consequences on facilitating self-employment. This observation provides support to our result since our sample of highly educated STLF employees is likely to have accumulated more wealth, thereby exhibiting a different behavior than generic samples used in studies such as Nikolaev and Wood (2018) and Andersson Joona and Wadensjö (2013).

Second, there is an interest in entrepreneurship scholarship to understand entrepreneurship as a career where mobility into entrepreneurship can be understood relative to other mobility options such as switching jobs (Burton, Sørensen, & Dobrev, 2016; Carroll & Mosakowski, 1987; Douglas & Shepherd, 2002). At the same time, career scholars have been calling for an interdisciplinary approach that integrates career research with other domains such as entrepreneurship (Akkermans & Kubasch, 2017). By examining how employees with higher levels of education are likely to evaluate their career options of either remaining in the same job, or moving to a different job or moving into entrepreneurship, we contribute to prior research that largely treats entry into entrepreneurship as a special case of the labor market (e.g. Vejsiu, 2011; Werner et al., 2014).

And third, research in entrepreneurship has argued that risk tolerant individuals are more likely to enter entrepreneurship but perform worse as entrepreneurs (Hvide & Panos, 2014; Knight, 1921). We hypothesized that employees with lower relative incomes, relative to those with higher relative incomes, through the process of social comparison are more likely to undertake risky activity such as entrepreneurship. By examining the entry size and initial income, we provide an understanding as to how employees are likely to initially fare in the labor market post entry into entrepreneurship. Our results indicate that employees with lower relative incomes, although more likely to enter entrepreneurship, are likely to fare poorly once they have entered entrepreneurship. In general, examining our results on the returns from entrepreneurship, our results are in line with prior research (e.g. Andersson Joona

& Wadensjö, 2013; Elfenbein et al., 2010; Hellerstedt, 2009; Hvide & Panos, 2014; Marx & Timmermans, 2017).

**Limitations:** There are limitations to our study that also constitute promising directions for future research. First, in this study we examined how income inequality, in terms of relative income, influences labor market mobility. However, inequality has many facets – for example, wealth (Cowen, 2014), gender (Boden, 1999) and status (Ridgeway, 2014). Future research could possibly explore these other facets of how inequality influences an individual's decision on mobility into entrepreneurship compared to switching jobs.

Second, this study focused on a specific labor force, generalizability is therefore a concern. Additional work needs to be done to examine the broader labor market (e.g. manufacturing) as the mobility dynamics could be different from that of the highly skilled labor force. Moreover, we looked at the STLF population as whole. There might be important differences in how different educational groups respond to income inequality, because they operate under very different labor markets. For example, engineers might have different opportunities than scientists. We do not differentiate between levels of education in our main analysis. Research suggest that PhDs behave different than people of other education levels when considering entrepreneurship (Åstebro, Braunerhjelm, & Broström, 2013).

And third, we focused on social comparison as the key mechanism to understand how relative income influences labor market mobility into entrepreneurship relative to a job switch. Future research could explore alternate mechanisms such as job matching (Jovanovic, 1979), job search (Burdett, 1978) or human capital (Becker, 1964).

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## Appendix I

### OLS Regression Analysis

	Income (log)
Age group (26-30)	0.11***(0.01)
Age group (31-35)	0.15***(0.01)
Age group (36-40)	0.19***(0.01)
Age group (41-45)	0.22***(0.01)
Age group (46-50)	0.24***(0.01)
Age group (51-55)	0.25***(0.01)
Age group (55+)	0.25***(0.01)
Gender (Male)=1	0.16***(0.00)
Married=1	0.04***(0.00)
Children	0.01***(0.00)
Kids Under 6	-0.06***(0.00)
Firm Tenure (2 yrs.)	-0.00(0.00)
Firm Tenure (3 yrs.)	-0.00(0.00)
Firm Tenure (4 yrs.)	0.00(0.00)
Firm Tenure (5 yrs.)	-0.01*(0.00)
Firm Tenure (6 yrs.)	-0.01**(0.00)
Firm Tenure (7 yrs.)	-0.02***(0.01)
Firm Tenure (8 yrs.)	-0.02***(0.01)
Total Work Exp.	0.02***(0.00)
Managers/Non-managers	0.57***(0.06)
Sum of Job Changes	0.01***(0.00)
Firm Size (51-250)	0.03***(0.00)
Firm Size (251-500)	0.02***(0.00)
Firm Size (500+)	0.04***(0.00)
Stockholm	0.07***(0.00)
PhD=1	0.11***(0.01)
Technology	0.02***(0.01)
Engineering	0.07***(0.00)
Mathematics	-0.01(0.01)
Constant	7.75***(0.06)
Observations	228,577
Log likelihood	-56533.01
R2	0.48

Standard errors in parenthesis, \*\*\* p<0.001, \*\* p<0.01, \* p<0.05. Controls also included: Occupation categories, industry categories, year fixed effects and industry categories

## Paper III





# Time Well Spent? The Effects of Duration and Number of Spells in Entrepreneurship on Returns from Entrepreneurship among the Science and Technology Labor Force (STLF) in Sweden

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# Abstract

This study provides a career understanding of entrepreneurship by examining how entrepreneurs are likely to be rewarded outside their entrepreneurial careers when they re-enter paid employment post entrepreneurship. Based on human capital theory, this study follows 8,050 individuals from the Swedish Science and Technology Labor Force (1990-2008) to investigate how the number of years and number of distinct spells in entrepreneurship affects subsequent wages for those that re-enter paid employment. Results indicate that with more years in entrepreneurship, ex-entrepreneurs are likely to earn higher wages compared to similar employees. However, ex-entrepreneurs with more than two spells in entrepreneurship have lower wages upon re-entry into paid employment, compared to similar employees who do not venture into entrepreneurship. Overall, the findings suggest that entrepreneurship needs consistent commitment. Entrepreneurs who spend a longer time in entrepreneurship hone and refine the skills from entrepreneurship that are valued by future employers. However, entrepreneurs with more spells in entrepreneurship, are unlikely to spend consistent enough time in entrepreneurship to allow them to develop the skills from entrepreneurship that are valued by future employers. This suggests that a longer duration and more number of spells in entrepreneurship are different facets of an entrepreneurial career that have distinct effects towards the returns from entrepreneurship.

**Keywords:** Human capital, returns from entrepreneurship, STLF

## Introduction

Literature in entrepreneurship recognizes that entrepreneurs engage in careers in established organizations prior to venturing into entrepreneurship (Sørensen & Fassiottto, 2011). Employees forego stable careers and wages in paid employment for a career in entrepreneurship. Individuals invest time, money and, effort into their entrepreneurial career in hopes of being rewarded for their efforts. Literature in entrepreneurship has focused not only on the rewards associated with a career in entrepreneurship by examining the returns during entrepreneurship (e.g. Hamilton, 2000; Åstebro & Yong, 2016) but also on the returns from entrepreneurship following the entrepreneurial experience (e.g. Bruce & Schuetze, 2004; Kaiser & Malchow-Møller, 2011; Luzzi & Sasson, 2016). In general, studies have investigated the returns from entrepreneurship by comparing the income of entrepreneurs relative to wages of employees who do not experience entrepreneurship (e.g. Luzzi & Sasson, 2016; Van Praag & Raknerud, 2017).

Although there has been growing interest in examining returns from entrepreneurship upon re-entering paid employment, the results have been

inconclusive, suggesting either positive or negative returns from entrepreneurship. For example, focusing on the Norwegian labor market, Luzzi and Sasson (2016) found that ex-entrepreneurs who entered paid employment earned 19% more on average than switching employees. However, in a study of Danish males, Kaiser and Malchow-Møller (2011) found that a spell in self-employment is associated with a 2.9% loss in hourly wages compared to employees who stay in dependent employment. They found however that the negative effect disappears if ex-entrepreneurs found employment in the same sector as where they had been self-employed.

A fundamental challenge of measuring the effect of entrepreneurship upon re-entry is the identification of the causal effect of entrepreneurship itself. Research suggests that entrepreneurs are not drawn at random. They are more likely to be employees with lower wages, male, “misfits”, from smaller firms and middle-aged (see for e.g. Evans & Leighton, 1989; Kacperczyk & Marx, 2016 ; Åstebro, Chen, & Thompson, 2011). They might select self-employment because they are poorly performing employees. The question of how much of these differences reflect the causal effect of experience in entrepreneurship, and not self-selection, is not an easy one to answer.

This study addresses this challenge using the Entropy Balanced (EB) Matching algorithm (Hainmueller, 2012) to identify the effect of entrepreneurship on wages of ex-entrepreneurs who re-enter paid employment by comparing them to employees who do not experience entrepreneurship. I draw upon human capital theory as an explanatory framework to theorize how the number of years in entrepreneurship and the number of spells in entrepreneurship influences subsequent wages on re-entry into paid employment. Human capital theory suggests that time spent during entrepreneurship is likely to affect the skills in entrepreneurship at the cost of honing different skills had entrepreneurs remained in wage employment. The effect of how time spent in one particular state influences subsequent careers has received significant attention in career research (Carroll & Mosakowski, 1987; Czafit & Köllő, 2015; Kroft, Lange, & Notowidigdo, 2013), but has received little attention in entrepreneurship research<sup>1</sup>.

I draw on matched employee-employer register data to study a sample of the 8,050 individuals from the Swedish Science and Technology Labor Force (STLF)<sup>2</sup> over the years 1990 -2008. I sample employees with STEM qualifications who had new jobs in 1991 and track their labor market transitions into incorporated

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1 Toft-Kehler, R., Wennberg, K., & Kim, P. H. (2014) study the financial performance of entrepreneurs using similar data but do not use a matched control group.

2 Labor force educated in Science, Technology, Engineering and Mathematics (STEM)

entrepreneurship<sup>3</sup> after three years in wage employment and back into paid employment from incorporated entrepreneurship. I then investigate the wages of ex-entrepreneurs by comparing them with matched workers who do not experience entrepreneurship.

The particular sample is important for several reasons. First, the study uses a matching technique to find a balanced sample, however the matching technique provides no safeguard against bias due to unobservable characteristics, which pose a difficult problem in observational studies (Hainmueller, 2012). Focusing on a homogenous sample of STLF employees not only helps to reduce the bias that is likely to be introduced due to unobserved variables, but also overcomes limitations posed by studies that investigate highly generic samples (see Elfenbein, Hamilton, & Zenger, 2010: 660 for details). Second, the STLF is of particular interest as employees from this labor force have high levels of human capital and are often depicted as those who are most likely to create high growth for firms (Eberhart, Eesley, & Eisenhardt, 2017; Elfenbein et al., 2010), and generally are seen as important forces for economic growth (Acs, Åstebro, Audretsch, & Robinson, 2016; Delmar, Wennberg, & Hellerstedt, 2011). Third, the long duration of 7 years allows me to follow individuals from when they are matched to their new jobs until they move into incorporated entrepreneurship and back into paid employment.

Results indicate that entrepreneurs who spend more than three years in entrepreneurship and re-enter paid employment are likely to increase their wages by 35% compared to their matched counterparts. However, I find that ex-entrepreneurs with more than two spells in entrepreneurship are likely to reduce their wages by 17% compared to their matched counterparts, suggesting negative returns with a greater number of spells in entrepreneurship. This suggests that future employers view a longer duration as “consistency” in a career, while a greater number of spells is viewed as “inconsistency” where entrepreneurs move in and out of entrepreneurship thereby having distinct effects on the returns from entrepreneurship. Entrepreneurs need to be consistent to their entrepreneurial careers to develop and refine skills in entrepreneurship that are likely to be valued by future employers.

This study provides two important contributions to research on the returns from entrepreneurship. First, this study provides a career understanding of entrepreneurship by investigating the returns from entrepreneurship outside entrepreneurship in a highly educated sample of the STLF who are likely to have substantial opportunity costs of leaving paid employment for entrepreneurship. Entry into entrepreneurship is not an end in itself and to understand entrepreneurship as a career, one needs to understand the outcome of entrepreneurship beyond entry

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<sup>3</sup> I focus exclusively on transitions into incorporated entrepreneurship as this ensures a better proxy for entrepreneurship (Levine, R., & Rubinstein, Y. 2017). See details on page 13.

(Burton, Sørensen, & Dobrev, 2016). Furthermore, this study compliments existing studies in entrepreneurship (e.g. Bruce & Schuetze, 2004; Campbell, 2013; Luzzi & Sasson, 2016) by theorizing and examining how returns from entrepreneurship are contingent on the number of years in entrepreneurship and the number of spells in entrepreneurship.

## Theory & Hypotheses Development

This study uses Human capital theory (Becker, 1964) as the main theoretical foundation to investigate the following questions: (1) What is the average effect of the number of years in entrepreneurship on wages of ex-entrepreneurs who re-enter paid employment, relative to employees who do not experience entrepreneurship? (2) What is the average effect of the number of spells in entrepreneurship on wages of ex-entrepreneurs who re-enter paid employment relative to employees who do not experience entrepreneurship?

Human capital theory has received significant attention in entrepreneurship research (Marvel, Davis, & Sproul, 2016) and has been the main theoretical foundation of previous research (e.g. Bruce & Schuetze, 2004; Campbell, 2013; Kaiser & Malchow-Møller, 2011) examining returns from entrepreneurship. Human capital theory provides an understanding of the knowledge and skills gained from entrepreneurship that are likely to influence the rewards associated with the entrepreneurial experience (Campbell, 2013).

Human capital (Becker, 1964; Lazear, 2009) refers to the skills, knowledge and ability gained by an individual either through education or work experience. Human capital can be acquired through education in school or thorough on the job training resulting from the labor market experience (Becker, 1964; Mincer, 1974). Human capital can broadly be classified as firm-specific human capital and generic human capital (Becker, 1964). Firm specific human capital involves acquiring skills that are idiosyncratic to the production process of a particular firm, while generic human capital involves skills (e.g. ethics) that are applicable across firms (Gimeno, Folta, Cooper, & Woo, 1997; Sørensen & Sharkey, 2014). Recently, Lazear (2009) suggested for using a more general view of specific human capital. Lazear suggests that most human capital is generic with only the combination of skills specific to the firm, while each of the skills, taken separately, is completely generic. For example, a Silicon Valley firm that provides tax optimization software would expect employees to be knowledgeable in tax laws, economics and programming and not be limited to a specialization in one of the three. None of the skills taken alone is firm-specific. The combination of the skills is specific to the firm. The combination of those skills is unlikely to be replicated in many other firms, making it difficult to find a firm where employee skills are likely to be transferred. Workers are unlikely

to transfer such a combination of skills with the same value to another job. This also suggests that skills that are highly generic in nature are likely to be transferred across firms.

A strong strand of entrepreneurship research suggests that entrepreneurship can be viewed as a labor market activity that needs individuals with a generic form of human capital. Entrepreneurs are more likely to have a mastery over a wide variety of skills such as general management, and the recruitment of additional workforce, making them more generalists, while employees in paid employment are likely to be more specialists (Lazear, 2004; Lazear, 2005; Åstebro & Thompson, 2011). This suggests that the human capital of entrepreneurs is likely to be different than those in paid employment.

Additionally, research suggests that individuals learn about this abilities over time. By engaging in a particular activity over a period of time, individuals develop additional human capital. People invest time in improving their skills and knowledge that influences their productivity (Bates, 1990; Stantcheva, 2017). As investments in human capital are likely to influence the compensation of individuals (Becker, 1962), the compensation is likely to differ based on the time individuals invest in an occupation. In terms of entrepreneurship, as entrepreneurs invest time into entrepreneurship, they are likely to develop additional generic skills from their entrepreneurial experience, which likely influences their compensation upon re-entry into paid employment.

## **Duration in Entrepreneurship**

I examine how the number of years in entrepreneurship influences subsequent wages in paid employment. I argue that entrepreneurs are different from wage earners, they gain more generic skills and knowledge from their entrepreneurial experience. As entrepreneurs spend longer time in entrepreneurship, they develop additional skills that are different from their initial skills. Such generic skills are likely to be highly valued in paid employment that is likely to have a positive influence on subsequent wages upon re-entry into paid employment.

The literature suggests entrepreneurship to be a labor market activity distinct from paid employment as it endows individuals with generic form of human capital (Chen & Thompson, 2014; Sørensen & Sharkey, 2014), for example, human capital obtained in broader areas and roles such as organizing, supervising and coordinating activities (Baptista, Lima, & Preto, 2012; Campbell, 2013). Furthermore, entrepreneurs are likely to be endowed with entrepreneurial attitudes, such as self-direction and the willingness to perform (Douglas & Shepherd, 2000), skills that are attractive to employers. In addition to the signaling value provided by such skills, Theunissen, Verbruggen, Forrier, and Sels (2011) suggest that future employers are likely to see opportunities to attract the clients and business contacts of former

entrepreneurs. Entrepreneurs are likely to use such contacts from their social networks to obtain lucrative jobs upon their return to wage employment (Theunissen et al., 2011).

Over time, entrepreneurs entering self-employment gradually learn about their abilities in entrepreneurship such as managerial skills by observing how well they perform (Bates, 1990). Research also suggests that over time, individuals develop a better match with their jobs (Bates, 1990; Flinn, 1986). This suggests that as entrepreneurs spend longer periods in entrepreneurship, they are more likely to be matched with entrepreneurship skills. Additionally, studies in entrepreneurship suggest that subsequent activities in entrepreneurship are different from initial activities (e.g. Delmar & Shane, 2004). Yang and Aldrich (2017: 38) argue that “entrepreneurs' subsequent activities directed toward raising more resources, establishing routines, and boundary development will substantially affect new ventures' survival”. The authors emphasize that founders are faced with initially poor conditions and founding firms face the “liability of newness”. However, over time, entrepreneurs are likely to overcome this liability of newness by acquiring additional resources, enacting routines and engaging in activities that differ from initial activities. This suggests that over time, entrepreneurs are endowed with additional human capital that is not only different from the initial human capital but newer generic skills different from paid employment (Lazear, 2005; Åstebro & Thompson, 2011).

Besides the generic skills gained from entrepreneurship, entrepreneurs who were previously wage employed are like to have general human capital gained from organizational work experience (Carroll & Mosakowski, 1987; Sorenson & Audia, 2000). Entrepreneurs with prior organizational experience are also likely to be endowed with information that facilitates the development of skills and routines that new firms are initially disadvantaged (Delmar & Shane, 2006).

The jack-of-all-trades theory (Lazear, 2004) suggests that over time, entrepreneurs develop greater generic human capital. Such general human capital is an important predictor of wages as workers with general human capital are likely to transfer the skills and appropriate value across firms (Bagger, Fontaine, Postel-Vinay, & Robin, 2014; Becker, 1994). This suggests that entrepreneurs, relative to the employees who remain in wage employment, learn newer skills from their entrepreneurial experience, newer skills such as management, raising financial resources and entrepreneurial attitudes. Over time, entrepreneurs are likely to develop additional human capital obtained from their prior work experience and from entrepreneurship. Upon re-entering paid employment, such entrepreneurs are likely to transfer these new skills, making them more valuable in the re-entered firms, suggesting higher wages for longer time spent in entrepreneurship. Thus:

H1: Entrepreneurs with more number of years in entrepreneurship are likely to have higher wages relative to employees with no entrepreneurial experience

## Number of Spells in Entrepreneurship:

I now examine how the number of spells in entrepreneurship influences subsequent wages in paid employment. I argue that although entrepreneurs are generally likely to gain more generic human capital from their entrepreneurial experience, moving in and out of entrepreneurship suggests work interruptions, prohibiting them from having sufficient time to develop and refine skills and making it more likely for them to face diminished returns upon moving back into paid employment.

Research in entrepreneurship suggests that entrepreneurship as an activity endows individuals with more generic skills than specific skills (e.g. Lazear, 2004; Lazear, 2005; Åstebro & Thompson, 2011). Individuals engaged in entrepreneurship develop generic skills that are more transferable across careers such as entrepreneurship or paid employment. However, research also suggests that interruptions in work depreciates the human capital stock of the focal individual (Mincer & Ofek, 1982). This suggests that the more spells in entrepreneurship, the more human capital is reduced in subsequent additional spells. Parker (2013: 657) suggests with each new spell in entrepreneurship, “Only a fraction of the human capital acquired in one venture may remain applicable in subsequent ones”. This argument suggests that with each new entrepreneurial spell, entrepreneurs acquire “newer” human capital that are suited to their new venture and that are different from that of the previous venture. This indicates that entrepreneurs are likely to carry over a fraction of the skills learned in entrepreneurship into paid employment. Additionally, as entrepreneurship is a labor market activity that is different from wage employment (Sørensen & Sharkey, 2014), entrepreneurs are unlikely to gain advantages of the limited skills gained, due to more number of spells in entrepreneurship. This suggests that the wages of entrepreneurs are likely to be lower with more number of spells in entrepreneurship, compared to the employees who do not experience entrepreneurship.

H2: Entrepreneurs with more number of spells in entrepreneurship are likely to have lower wages relative to employees with no entrepreneurial experience.

## Sample & Method

I investigate the research question using a linked employee-employer dataset provided by Statistics Sweden (SCB) consisting of STLF in Sweden from 1990-2008. The study identifies STLF employees based on education codes provided by SCB that help identify employees in science, technology, engineering and mathematics as well as their education levels (Bachelors/Masters/PhD). Using the education levels, I include individuals with three or more years of qualified post-

secondary education (including individuals with doctoral and other postgraduate degrees) (Delmar et al., 2011).

The Swedish empirical context is somewhat different from the empirical context of previous studies. For example, the Swedish context is different from the Danish context that is studied by Kaiser and Malchow-Møller (2011). The Swedish context, although similar to Denmark in welfare state terms, is different from Denmark in terms of the flexibility in hiring and firing employees, due to the presence of strong labor unions in Sweden. Additionally, the Swedish labor market, characterized by the coordinated market economy (CME), is also different from other studies, for example Bruce and Schuetze's (2004) study that investigated the US labor market, characterized by the liberal market economy (LME)<sup>4</sup>. A different labor market context allows an understanding different from prior studies. The Swedish welfare state suggests a relatively rigid labor market where hiring and firing is relatively difficult due to the presence of strong labor unions. However, the STLF is likely to be in high demand due to their high human capital, making re-entry into paid employment relatively easier.

I build the sample in the following three steps. First, I include employees with a new job in 1991. A new job in 1991 ensures that these employees had no prior experience in the focal firm and enables estimates of similar employees (Burton, Dahl, & Sorenson, 2017). It also reduces biasing due to left censoring (Yang & Aldrich, 2012). Second, I follow these employees from 1991-1993 to include only those who remained in paid employment during this period. This ensures exclusion of employees who may have become unemployed or have tried a very small window (1-2 years) of experience in entrepreneurship reducing biases due to unemployment and serial entrepreneurship (Sørensen, 2007). This also enables us to focus on a restricted sample of employees who had stable careers in paid employment over a period of the three years prior to their venturing into entrepreneurship, and is a suggestive indicator of the higher opportunity costs of venturing into entrepreneurship. Studying the returns from entrepreneurship becomes pertinent for such individuals if such employees move back into paid employment after experiencing entrepreneurship. Third, I follow these employees from their transitions into incorporated entrepreneurship from wage employment and re-entry into paid employment from incorporated entrepreneurship from 1994-2008.

This study focuses exclusively on transitions from wage employment into incorporated entrepreneurship and from incorporated entrepreneurship into paid employment. Focusing on transitions into incorporated entrepreneurship ensures a better proxy for entrepreneurship over self-employment for the following four

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<sup>4</sup> The reader is guided to Korpi (2006) and other studies such as Swenson, P. A. 2002. *Capitalists against Markets: The Making of Labor Markets and Welfare States in the United States and Sweden*: Oxford University Press., for a detailed discussion on the Swedish welfare state and the emergence of the CME



reasons. First, the incorporated legal form possess a growth option through limited liability, whereas unincorporated entries mostly represent sole proprietorships (Lazear, 2005; Levine & Rubinstein, 2017). Second, there are different financial entry requirements, different access to equity and loans, different liability for external audits, and different legal and tax requirements creating a financial and legal threshold for incorporated entries (Delmar et al., 2011; Edmark & Gordon, 2013; Parker, 2009). Third, Levine and Rubinstein (2017) suggest that individuals who enter unincorporated entrepreneurship tend to require more manual skills such as landscaping, carpentry and truck driving, while individuals who enter incorporated entrepreneurship perform activities that demand strong non-routine cognitive skills such as creativity and analytical thinking and are also likely to be more educated. Fourth, incorporated entries create more economic value. Individuals who create incorporated firms are individuals with strong ability and are also known to create 50% more jobs than sole proprietors (Åstebro & Tåg, 2015). Hence, it is an important distinction, as not separating the two could lead to misleading inferences about high-impact Schumpeterian entrepreneurship and small business activity (Elfenbein et al., 2010; Henrekson & Sanandaji, 2014; Levine & Rubinstein, 2017). The arguments suggest that incorporated entrepreneurship, rather than sole proprietorship, is a better proxy for entrepreneurship.

The research design of a new job and a subsequent three year career in wage employment allows to focus on employees with a fixed tenure prior to their entry into incorporated entrepreneurship. This design differs from Kaiser and Malchow-Møller (2011) who focused on employees in 1990 and their subsequent entry into self-employment and re-entry into paid employment. Such a design is likely to include employees with varying tenures in wage employment prior to their entry into entrepreneurship, which is likely to have a different influence on wages in subsequent paid employment. Additionally, a focus on self-employment by Kaiser and Malchow-Møller (2011) is likely to induce heterogeneity by bringing individuals who consider mere self-employment and incorporated entrepreneurship as proxies for entrepreneurship. Literature suggests that self-employment and incorporated entrepreneurship are different proxies for entrepreneurship (Levine & Rubinstein, 2017) suggesting that focusing on one type of entrepreneurship is likely to have homogeneity in the sample.

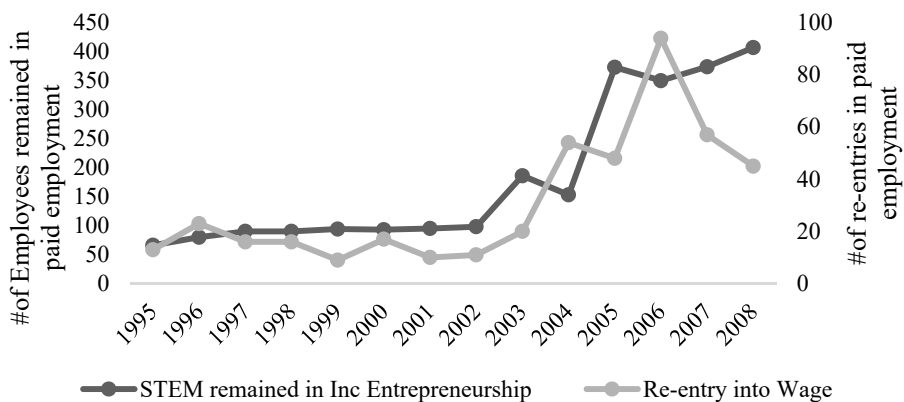
The research design is limited however because Statistics Sweden records occupation only once a year, meaning that the study cannot follow individuals who may have had a very small window of entrepreneurial experience (e.g. 2-3 months) within two consecutive years. This limitation is also echoed by Kaiser and Malchow-Møller (2011) and other related studies that use similar datasets (e.g. Luzzi & Sasson, 2016).

Overall, the research design of this study limits the problem of unobserved heterogeneity – a fundamental challenge in identifying the effects of entrepreneurship on subsequent wages as differences between individuals may

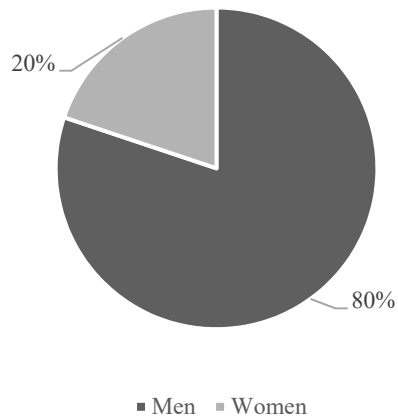
simultaneously affect choice of entrepreneurship and subsequent wages (Kaiser & Malchow-Møller, 2011) – by focusing on a homogenous sample of STLF employees with new jobs and fixed tenure prior to venturing into incorporated entrepreneurship.

## Data Descriptive

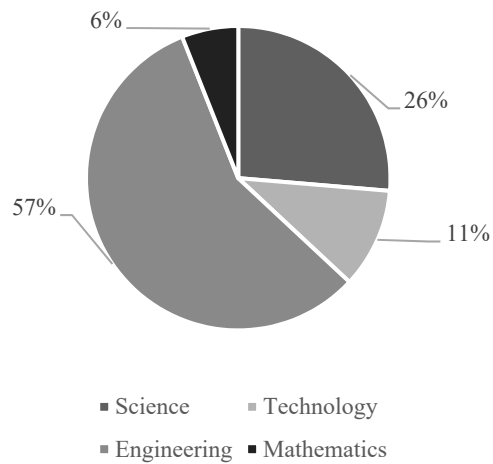
Figure 1 presents the re-entry transitions from incorporated entrepreneurship into wage employment from 1995 to 2008. For the entire study period, there are a total of 433 transitions back into paid employment out of 903 entries into incorporated entrepreneurship. This forms 48% of re-entries into paid employment. This observation is similar to Kaiser and Malchow-Møller (2011) who reported 50.8% of transitions being back into paid employment. Additionally, I observe that among those who re-enter paid employment, men form a large share (80%) (Fig. 2), a large share is by scientists and engineers (total: 83%) (Fig. 3), a significant share of entrepreneurs move into younger firms between than 3 years to 10 years of age (53%) (Fig. 4) and into smaller firms with less than 50 employees (68%) (Fig. 5).



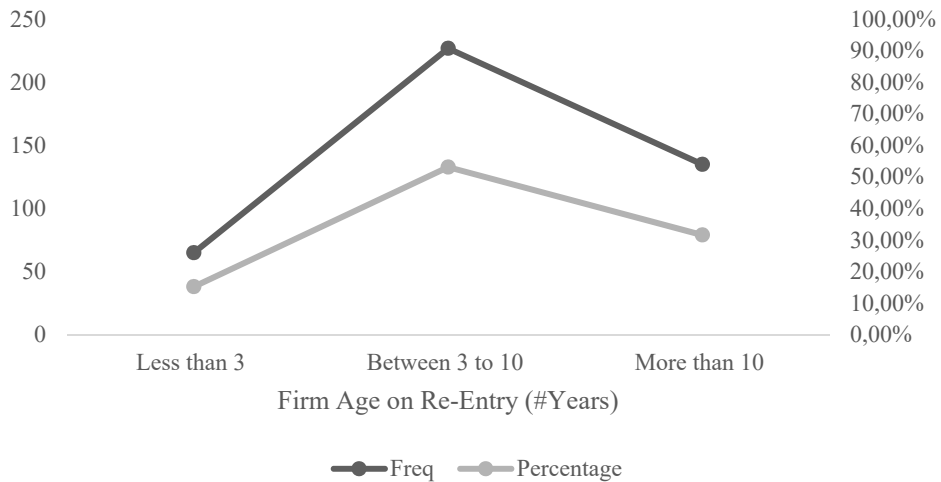
**Figure 1**  
Re-entry transitions from 1995-2008



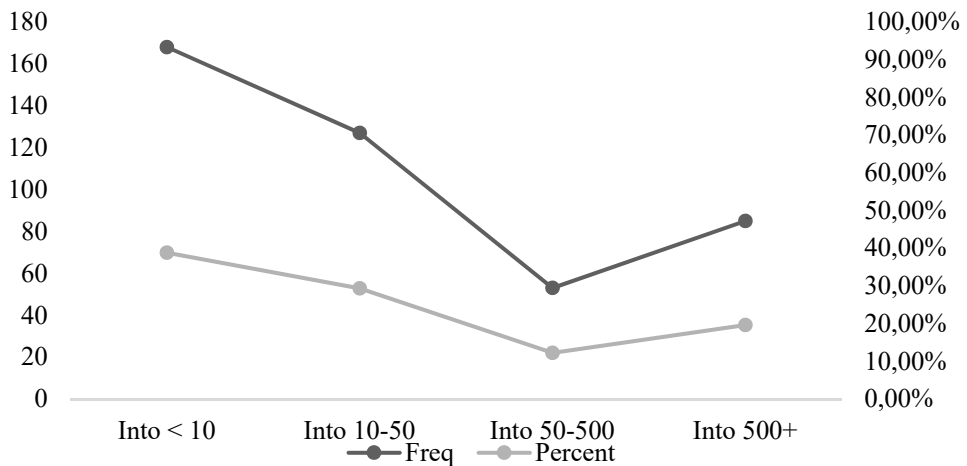
**Figure 2.**  
Re-entries (Men & Women)



**Figure 3.**  
Re-entries (STEM)



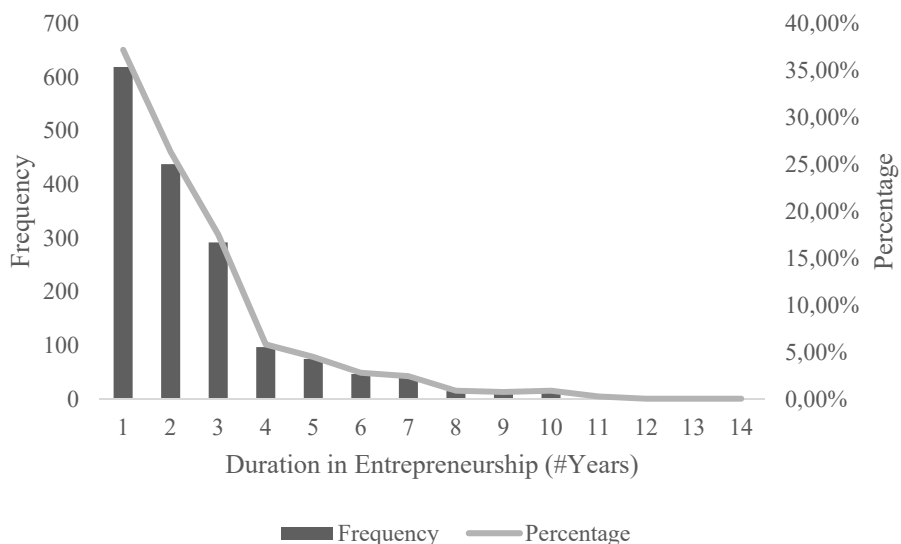
**Figure 4**  
Firm Age on Re-entry



**Figure 5**  
Firm Size on Re-entry

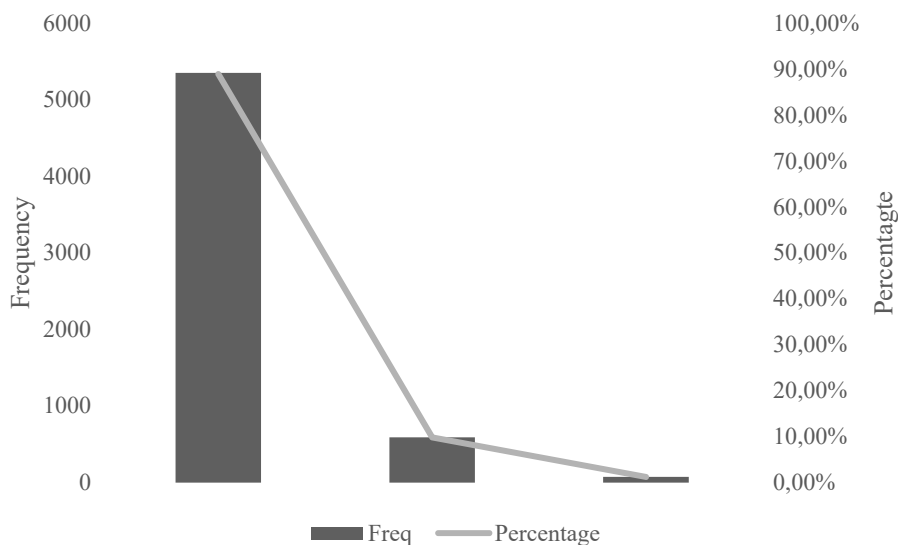
In summary, the data suggests that STLF employees who enter incorporated entrepreneurship from wage employment and re-enter paid employment from incorporated entrepreneurship are more likely to be male, engineers and scientists who venture from smaller firms into paid employment and move back into smaller firms in paid employment.

Figure 6 demonstrates the time spent in entrepreneurship prior to moving back into paid employment. Approximately 40% of the entrepreneurs move back into paid employment after a 1 year experience in entrepreneurship. This observation is higher than that indicated by Kaiser and Malchow-Møller (2011) who indicated that 27% of entrepreneurs move back into paid employment after 1 year in entrepreneurship. The higher percentage in this sample, although higher than Kaiser and Malchow-Møller (2011), is in line with other studies (e.g. Manso, 2016: 24) who suggest that 52% of self-employment spells last less than two years. The plausible explanation for this observation can be attributed to entrepreneurship being an experimentation where highly skilled STLF employees learn quickly about the quality of their ideas and move back earlier into paid employment.



**Figure 6**  
Duration in Entrepreneurship

Figure 7 demonstrates the number of spells in entrepreneurship prior to moving back into paid employment. Most (approx. 90%) of the entrepreneurs, have one spell in entrepreneurship, around 10% have two spells, while a very small percentage of entrepreneurs (less than 1%) have three spells in entrepreneurship.



**Figure 7**  
Number of Spells in Entrepreneurship

## Variable construction

### *Dependent variables:*

*Wage (log):* The study follows Kaiser and Malchow-Møller (2011) and other related studies Luzzi and Sasson (2016) and Bruce and Schuetze (2004) to test the hypotheses on log transformed wages in subsequent paid employment.

### *Independent variables*

*Duration in entrepreneurship:* The study adds a variable that has the number of years the focal entrepreneurs spend in entrepreneurship. To obtain effects for specific duration categories, this variable is coded as a categorical variable with 1 year, 2 years, 3 years and more than 3 years.

*Number of spells in entrepreneurship:* This variable is entered as a categorical variable with the number of spells in entrepreneurship as the total sum of the number of times the focal employee has ventured into entrepreneurship. Specifically, it is coded 1 for one spell in entrepreneurship, 2 for two spells in entrepreneurship while 3 for three spells in entrepreneurship.

### *Controls*

At the individual level, the study controls for the following variables. *Age*: is included to capture the effect of age of the entrepreneur on entrepreneurial entry. The information is obtained from his/her date of birth indicated on their national ID. *Gender*: Prior research documented substantial variation in entrepreneurial behavior of individuals across genders, where women transitioning to entrepreneurship was rarer than men transitioning. The variable is coded “1” for males. *Married*: An individual’s preference for entrepreneurship may vary according to his/her marital status. To control for the unobserved preferences that are common to married individuals, the variable is binary coded as “1” for married, and “0” otherwise. *#Children*: A count variable indicating the number of dependent children belonging to the focal individual. *#Children Under six*: A count variable indicating the number of children under the age of six. *Capital Income (log)* indicates the interest received on cash deposits that indirectly measure the liquid wealth of the focal individual, and hence accounts for the liquidity constraint (Hurst & Lusardi, 2004). *Prior tenure*: The total number years in paid employment prior to entry into entrepreneurship. *Government Firm*: Since the dynamics of entrepreneurship is markedly different in government sectors (Sørensen, 2007), this variable is coded “1” if the employee works in a government firm and coded “0” if the employee works for a non-government firm. *Scientist*: Coded “1” for individuals educated in natural science and “0” for others. *Technologist*: Coded “1” for individuals educated in computer science and electronics and “0” for others. *Engineers*: Coded “1” for engineers and “0” for others. *Mathematics*: Coded “1” for individuals educated in mathematics and “0” for others. *PhD*: This is a dichotomous variable coded “1” if the employee has obtained a PhD or coded “0” otherwise. *Stockholm County*: A dichotomous variable to indicate whether the individual is living in the Stockholm County. *Income at t-1*: Income of the individual at  $t-1$ .

The study uses the following variables to control for the organizational characteristics of the new employer. *Employer Age*: is entered as categorical dummies divided into three categories: < 3 years (omitted category); 3-10 years; and 10+ years. *Employer Size*: Firm size is calculated based on the total number of employees in the organization. This variable is entered as a categorical variable with the following categories: <= 10 employees (omitted category), 10-50 employees, 50-500 employees, and 500+ employees. *Operating Profit at t-1*: Operating profit of the firm to indicate firm performance.

*Year* and *Industry* dummies are added to control for other macro level unobservables to capture time trends or shocks in the economy.

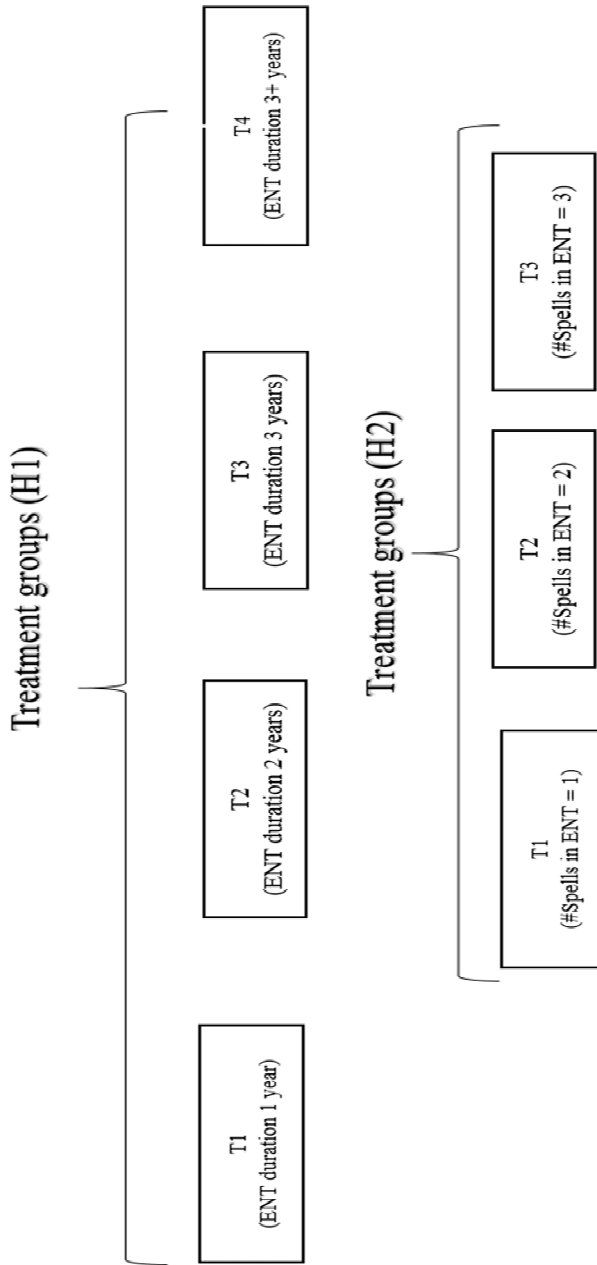
## **Analysis**

The main objective of this study is to estimate the treatment effect of the number of years and the number of spells in entrepreneurship on the wages of entrepreneurs who re-enter paid employment. To test the hypotheses, this study follows Kaiser and Malchow-Møller (2011) to use matching methodology to compare the earnings of ex-entrepreneurs with employees who do not experienced entrepreneurship by identifying the treatment and control groups.

### **Definitions of treatment and control groups:**

I follow Kaiser and Malchow-Møller (2011- Fig 1: page 581) to identify appropriate treatment groups to test each of the hypotheses of the study (see fig.8) . Specifically, to test hypothesis 1, I identify the treatment groups based on the number of years in entrepreneurship. Specifically, Treatment 1 (T1) for one year in entrepreneurship, T2 for two years in entrepreneurship, T3 for three years in entrepreneurship, and T4 for more than three years in entrepreneurship. Similarly, to test hypothesis 2, I build three treatment groups to test for the number of spells in entrepreneurship: T1 for one spell in entrepreneurship, T2 for two spells in entrepreneurship and T3 for three spells in entrepreneurship.





**Figure 8**  
Treatment and Control groups for H1 and H2

I identify employees in paid employment to define the control groups to match with ex-entrepreneurs. Specifically, the control group consists of individuals who are in paid employment and who do not acquire any entrepreneurial experience over the study period.

### *Matching methodology*

As the hypotheses are tested using the matching methodology, it is essential to find balanced samples for the treatment and control groups. The basic descriptive statistics (Table 1) divulge that these groups are composed of very different individuals. For example, the ‘never entrepreneurs’ group has an average age of 39.37 years while the ‘ex-entrepreneurs’ group has an average age of 44.71 years. There are also differences in the individuals based other variables such as capital income and the number of children. Before proceeding with any comparison, it is important to generate a balanced sample of both groups. The generation of a balanced sample provides an unbiased estimate of the Average Treatment effect on the Treated (ATT). The ATT is the binary coded outcome variable that helps capture the treatment effect of the treatment (in this case, entrepreneurship).

**Table 1**  
Matching Descriptives (mean vales)

	Before Matching				After Matching	
	Treatment		Control		Treatment & Control	
	(Mean)	(Variance)	(Mean)	(variance)	(Mean)	(Variance)
Age	44.71	21.73	39.37	41.18	44.71	29.74
Gender	0.74	0.19	0.71	0.20	0.74	0.18
Married	0.76	0.18	0.60	0.24	0.76	0.18
#Children	1.77	1.17	1.39	1.36	1.77	1.26
Children Under Six	0.38	0.43	0.59	0.68	0.38	0.47
Scientist	0.22	0.17	0.30	0.20	0.21	0.17
Technologist	0.18	0.15	0.09	0.08	0.18	0.15
Engineer	0.55	0.25	0.54	0.25	0.55	0.25
Mathematician	0.04	0.04	0.06	0.05	0.04	0.04
PhD.	0.09	0.08	0.11	0.10	0.09	0.08
Stockholm County	0.12	0.10	0.17	0.14	0.12	0.10
Capital Income (log)	2.59	10.78	1.59	6.33	2.59	10.35
Employer Size	2.56	1.36	3.32	0.96	2.56	1.46
Employer Age	2.19	0.46	2.17	0.44	2.19	0.49
Industry Affiliation	8.59	6.82	7.34	15.32	8.59	8.50
Sector	0.80	0.15	.50	0.25	0.80	0.16

I follow recent research (e.g. Merida & Rocha, 2018) using *Entropy Balancing (EB)* as a matching technique to match matches of each of the groups, i.e. ex-entrepreneurs (treatment group) and never entrepreneurs (control group). One of the main advantages of EB (over other popular matching methods such as Propensity Score Matching), is that EB helps avoid the manual iterative process of modeling, matching and balance checking of PSM that in the worst case are likely to increase bias for the subsequent treatment effects. In EB, the researcher begins by imposing a set of balance conditions to imply that the treated and the reweighted control group match as closely as possible. EB then directly adjusts the unit weights to the specified sample moments while moving the weights as little as possible to retain information (Hainmueller, 2012).

This study follows previous studies (e.g. Kaiser & Malchow-Møller, 2011; Luzzi & Sasson, 2016; Manso, 2016) to construct matched samples based on observational characteristics – age, gender, marital status, number of children, children under six, type of firm (government or non-government), PhD, Stockholm county, capital income, area of qualification (Scientist/Technologist/Engineer/Medicine), employer size, employer age and industry affiliation.

Although the EB technique simplifies the generation of the balanced sample, it provides no safeguard against bias due to unobservable characteristics, which poses a difficult problem in observational studies (Hainmueller, 2012). Although this study acknowledges the bias due to unobservables, it follows similar entrepreneurship studies (e.g. Kaiser & Malchow-Møller, 2011; Luzzi & Sasson, 2016; Manso, 2016) that use matching techniques on possible observable characteristics. Additionally, Angrist and Pischke (2008) suggest that an alternative strategy to reducing bias due to unobservables is reducing the heterogeneity of the treatment and control groups. This study addresses this concern by considering a homogenous sample of STLFE employees with new jobs in 1991 to produce a balanced sample of treatment and control groups. After the completion of the EB technique, the sample generates a balanced sample (see Table 1) of nearly identical treatment and control groups. After the samples are matched using EB, the study runs the main regressions using the weights provided by the EB algorithm and the treatment variable to obtain unbiased estimates of the ATT. The study follows Kaiser and Malchow-Møller (2011) to use the OLS regression with the associated weights provided by the EB algorithm.

# Results

## Duration in Entrepreneurship

Hypothesis 1 suggests that wages on re-entry are likely to increase with longer spells in entrepreneurship. To test this hypothesis, I follow Kaiser and Malchow-Møller (2011) to create a treatment group based on each category of the duration variable. For each value in Table 2, the ATT is the coefficient estimate on the dummy variable for the treatment in the OLS regression on the natural log of wages in paid employment. Column 1 in Table 2 presents the ATT estimates of the OLS regression (with weights from the EB algorithm) of each treatment groups (based on the number of years in entrepreneurship). Column 2 presents the ATT estimates for each of the treatment groups but includes the controls at the individual level, firm level and industry level. In column 1 and column 2 the reference category is the control group of employees who remain in paid employment during the study period. This is the central control group considered by Kaiser and Malchow-Møller (2011) and Bruce and Schuetze (2004).

**Table 2**  
Results Hypothesis 1 (Duration in Entrepreneurship)

Treatment Groups	Control Group of Matched Employees in Paid employment (N=138,454)	
	ATT	ATT with controls
	(1)	(2)
T1 (N=619) (Duration in Entrepreneurship 1 year)	0.23*** (0.03)	0.18*** (0.03)
T2 (N=438) (Duration in Entrepreneurship 2 years)	0.21*** (0.03)	0.11*** (0.04)
T3 (N=292) (Duration in Entrepreneurship 3 years)	0.25*** (0.04)	0.14*** (0.03)
T4 (N=345) (Duration in Entrepreneurship more than 3 years)	0.34*** (0.04)	0.07* (0.03)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income (log), Firm Size (categories), Firm Age (categories), Industry (categories), Occupations (categories), Year, Previous income, operating profit Standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

The ATT for T1 (treatment group 1) in the first row of column 1 is positive (0.23; p<0.001) and the ATT for T4 is 0.35; p<0.001. This suggests that entrepreneurs who spend one year in entrepreneurship earn 23% more than matched employees who do not venture into entrepreneurship. Entrepreneurs who spend more than three years in entrepreneurship increase their wages by 35% compared to matched employees. The results confirm hypothesis 1. This result suggests that a longer spell in entrepreneurship endows entrepreneurs with additional skills, different from the

initial skills. Overall, the coefficients reported are in line with similar studies in entrepreneurship that use the Swedish dataset. For example, Lougui and Broström (2018) compare entrepreneurs who enter paid employment with employees without entrepreneurial experience from 2001-2006 to report that on average, ex-entrepreneurs make 22% more than employees in paid employment with no entrepreneurial experience.

I conduct an additional analysis by refining the basic control group into two groups – employees who remain in the same job throughout the study period (C1) and switching employees (C2). Refining the basic control group into C1 allows me investigate the returns from entrepreneurship of ex-entrepreneurs by comparing them to employees who had been consistently employed in one firm throughout the study period. Employees who were consistently employed in the same job were likely to develop very high firm-specific human capital while ex-entrepreneurs were more likely to develop generic human capital due to their entrepreneurial experience. By comparing ex-entrepreneurs with such employees provides a nuanced understanding of the returns from entrepreneurship that helps us understand how the human capital of entrepreneurs is likely to be valued after time is spent in entrepreneurship, relative to the human capital employees who remained in the same firm throughout the study period.

Additionally, I follow Luzzi and Sasson (2016) to refine the basic control group into employees who switch jobs during the study period. Comparing their wages to switching employees allows a comparison of similar groups in terms of job switches.

**Table 3**  
Additional Analysis for Hypothesis 1 (Duration in Entrepreneurship)

	Control Group of Matched Employees in Paid employment (Non-switchers) (N=14,256)	Control Group of Matched Employees in Paid employment (Switchers) (N=138,445)
Treatment Groups	ATT	ATT
	(1)	(2)
T1 (N=619) (Duration in Entrepreneurship 1 year)	0.21*** (0.05)	0.22*** (0.03)
T2 (N=438) (Duration in Entrepreneurship 2 years)	0.22*** (0.08)	0.21*** (0.03)
T3 (N=292) (Duration in Entrepreneurship 3 years)	0.27*** (0.04)	0.25*** (0.04)
T4 (N=345) (Duration in Entrepreneurship more than 3 years)	0.48*** (0.15)	0.35*** (0.04)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income (log), Firm Size (categories), Firm Age (categories), Industry (categories), Occupations (categories), Year, Previous income, operating profit Standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

The reported coefficient (Table 3, Model 1) for one year in entrepreneurship (T1) is positive (0.21;  $p < 0.001$ ) compared to employees in the same firm, while more than three years in entrepreneurship (T4) is 0.48;  $p < 0.001$ . The results suggest that compared to employees in who remain employed in the same firm, ex-entrepreneurs are likely to increase their wages by 48% after spending more than three years in entrepreneurship. Consistently spending longer years in entrepreneurship is likely to be valued more by hiring employers who value the human capital of ex-entrepreneurs.

Comparing ex-entrepreneurs with switching employees, the results (Table 3, Model 2) suggest positive co-efficient (0.21;  $p < 0.001$ ) for ex-entrepreneurs with one year in entrepreneurship compared to employees who have switched jobs. The co-efficient increases to 0.35 ( $p < 0.001$ ) for ex-entrepreneurs with more than three years in entrepreneurship. The results suggest that compared to switching employees, ex-entrepreneurs increase their wages by 35% after spending more than three years in entrepreneurship. Overall, the results lend support to the idea that consistency in entrepreneurship has significant positive effects for ex-entrepreneurs who spend longer durations in entrepreneurship.

### **Number of Spells in Entrepreneurship**

Hypothesis 2 suggests that the more the number of spells in entrepreneurship, the lower the wages on re-entry. As the maximum number of spells in entrepreneurship is three during the period of study, I follow Kaiser and Malchow-Møller (2011) to create a treatment group based on the number of spells in entrepreneurship. Each value in Table 7, the ATT is the coefficient estimate on the dummy variable for the treatment in the OLS regression on the natural log of wages in paid employment. Column 1 in Table 4 presents the ATT estimates of the OLS regression (with weights from the EB algorithm) of each treatment group (based on the number of years in entrepreneurship). Column 2 presents the ATT estimates for each of the treatment groups but includes the controls at the individual level, firm level and industry level. In column 1 and column 2 the reference category is the employees who remain in paid employment in the study period. This is the central control group considered by Kaiser and Malchow-Møller (2011) and Bruce and Schuetze (2004).

**Table 4**  
Results Hypothesis 2 (#Spells in Entrepreneurship)

Treatment Groups	Control Group of Matched Employees in Paid employment (N=138,454)	
	ATT	ATT with controls
	(1)	(2)
T1 (N=1655) (#Spells 1)	0.16*** (0.02)	0.10*** (0.02)
T2 (N=148) (#Spells 2)	0.29*** (0.04)	0.17*** (0.04)
T3 (N=15) (#Spells 3)	-0.17** (0.05)	-0.20*** (0.04)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income (log), Firm Size (categories), Firm Age (categories), Industry (categories), Occupations (categories), Year, Previous income, operating profit. Standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

The ATT for T1 (treatment group 1) in the first row of column 1 is positive (0.16; p<0.001) while the ATT for T3 is negative (-0.17; p<0.001). This suggests that entrepreneurs who have one spell in entrepreneurship increase their wages by 16% compared to matched employees who do not venture into entrepreneurship, while entrepreneurs who have three spells in entrepreneurship decrease their wages by 17% compared to matched employees. The magnitude of the effect of three spells is dramatic: from significantly positive to significantly negative. This confirms hypothesis 2. In general, the results indicate that with each new spell in entrepreneurship, entrepreneurs face unique challenges (Toft-Kehler, Wennberg, & Kim, 2014) that depreciate their human capital, where entrepreneurs' skills are unlikely to be carried over into a another spell. With more number of spells, entrepreneurs are unlikely to gain the skills that can be transferred into paid employment. While employees who remain in paid employment indicate consistency in one occupation and are likely to earn better rewards than entrepreneurs who switch in and out of entrepreneurship.

I conduct an additional analysis by refining the basic control group into two groups – employees who remain in the same job throughout the study period (C1) and switching employees (C1) – for reasons similar to those explained in the results of hypothesis 1.

**Table 5**

Additional Analysis for Hypothesis 2 (#Spells in Entrepreneurship)

	Control Group of Matched Employees in Paid employment (Non-switchers) (N=14,256)	Control Group of Matched Employees in Paid employment (Switchers) (N=138,445)
Treatment Groups	ATT	ATT
	(1)	(2)
T1(N=1,655) (#Spells 1)	0.16*** (0.04)	0.16*** (0.02)
T2 (N=148) (#Spells 2)	0.29* (0.12)	0.29*** (0.04)
T3 (N=15) (#Spells 3)	-0.28** (0.09)	-0.17*** (0.05)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income (log), Firm Size (categories), Firm Age (categories), Industry (categories), Occupations (categories), Year, Previous income, operating profit Standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

The reported coefficient (Table 5, Model 1) for one spell in entrepreneurship (T1) is positive (0.16;  $p<0.001$ ) compared to employees in the same firm, while three spells in entrepreneurship is negative (-0.28;  $p<0.01$ ). In general, the results suggest that compared to employees in the same firm, ex-entrepreneurs faced substantially lower wages in subsequent paid employment after three spells in entrepreneurship. Employees consistently employed in the same firm were likely to reap higher rewards – possibly being rewarded for their commitment to a stable career in the same firm.

Comparing ex-entrepreneurs with switching employees, the results (Table 5, Model 2) suggests positive co-efficient (0.16;  $p<0.001$ ) for ex-entrepreneurs with one spell in entrepreneurship compared to employees who have switched jobs, while negative co-efficient (-0.17;  $p<0.001$ ) for ex-entrepreneurs with more than three spells in entrepreneurship. The results suggest that compared to switching employees, ex-entrepreneurs faced significantly decreased wages after spending more than one spell in entrepreneurship.

## Discussion & Implications

The study uses a matched employee-employer register data from Statistics Sweden covering the years 1990-2008 to examine the returns from entrepreneurship by investigating the wages of highly skilled entrepreneurs from the STLF who re-enter paid employment following their entrepreneurial experience. Based on human capital theory, the study argues that wages upon re-entry are likely to be influenced by the generic human capital gained during the periods of entrepreneurship. Specifically, the study examines how the wages of ex-entrepreneurs on re-entry,



relative to matched employees who do not experience entrepreneurship, are influenced by the number of years in entrepreneurship and the number of spells in entrepreneurship.

Prior studies that contribute to this research (e.g. Bruce & Schuetze, 2004; Daly, 2015; Kaiser & Malchow-Møller, 2011; Luzzi & Sasson, 2016) have mixed results, with both positive and negative returns from entrepreneurship. Studying a sample of Norwegian employees and entrepreneurs from 2006 to 2012, Luzzi and Sasson (2016) found that on average, entrepreneurs increased their wages by 19% compared to employees who switch jobs. Additionally, drawing on the Panel Study of Income Dynamics (PSID) data, Daly (2015) found that individuals who attempt self-employment receive a gain of 22% (significant) in labor and asset income and a gain of 8% (insignificant) of their labor income. Daly also found that gains vary by occupation – technical occupations gain 45% after 15 years while craftsman see no significant differences in income. On the other hand, studying a sample of Danish men observed between 1990 and 1996, Kaiser and Malchow-Møller (2011) found that a spell of self-employment is associated with lower hourly wages relative to matched employees in paid employment. However, Kaiser and Malchow-Møller (2011) also found that the negative returns disappeared for entrepreneurs who moved back into the same sector as their self-employment sector. In general, studies look at the effect of entrepreneurship *per se*, and how this effect changes depending on factors such as occupations and sector switching.

This study (H1) finds that with longer time spent in entrepreneurship, wages are positive upon re-entry. The result of this hypothesis is consistent with prior studies (e.g. Manso, 2016) that examined self-employment as an experimentation. The literature suggests that self-employed individuals engage in experimentation when they engage in entrepreneurship, as a result, most entrepreneurs exit entrepreneurship after about 2 years. Entrepreneurs quickly learn about the quality of their ideas and are therefore less likely to have a penalty on their earning. This suggests that entrepreneurs are likely to spend longer time in entrepreneurship after knowing the quality of the ideas. The result of this study also suggests that as entrepreneurs spend time in entrepreneurship, they garner additional skills that are different from the skills obtained during the initial years. Over time, the subsequent human capital helps garner skills that are more valued across firms, which increases the likelihood of higher wages upon re-entry. E.g. after overcoming initial challenges such as the liability of newness, entrepreneurs may go in for an IPO, helping them gain newer skills that are valued once they move back into paid employment.

Hypothesis H2 of this study suggests that the more entrepreneurial spells, the lower the wages upon re-entry into paid employment. The results suggest that with more entrepreneurial spells, entrepreneurs are penalized in paid employment, leading to lower wages. Although not directly comparable, these results are in line with studies such as Parker (2013: 657) who suggested that the performance trajectory of serial

entrepreneurs over successive ventures involves *positive* returns that depreciate over time. The hypothesis (with empirical support) posited by Parker is tested by looking at serial entrepreneurs re-entering another entrepreneurial venture. Comparing the result of this study with that of Parker, the result of this study suggests that serial entrepreneurs, broadly identified here as moving into and out of entrepreneurship, are penalized for their decision to re-enter paid employment. Serial entrepreneurs, although likely to find positive but diminishing returns in their successive entrepreneurial ventures, are more likely to find diminishing (but negative) returns to more spells in entrepreneurship when they move back into paid employment.

The results from this study imply higher returns for STLTF entrepreneurs in the labor market - entrepreneurs who spend more than three years in entrepreneurship earn 48% more than employees who switch jobs. This result is higher than those reported in similar entrepreneurship studies. For example, Luzzi and Sasson (2016) suggest that ex-entrepreneurs earn 19% more than employees who switch jobs. There are possible likely explanations to this contrasting result. First, my study examines a highly qualified labor force compared to other studies that examine generic samples. The highly qualified STLTF has higher returns to education (Mouw & Kalleberg, 2010) and also higher generic human capital making them highly attractive in the labor market (Gimeno et al., 1997). Second, I focus on employees who venture into incorporated entrepreneurship and subsequently re-enter paid employment. Levine and Rubinstein (2017) suggest that the individuals who enter incorporated entrepreneurship perform activities that demand strong non-routine cognitive skills such as creativity and analytical thinking. This indicates that employees who venture into incorporated entrepreneurship are likely to be “smart” individuals who are likely to be attractive to employers.

## **Theoretical & Practical Contributions**

This study makes several important contributions. First, understanding the wages on re-entry post entrepreneurship provides a comprehensive career perspective where individuals enter entrepreneurship, exit and then re-enter wage-employment. Entry into entrepreneurship is not an end in itself but is part of a dynamic career (Burton et al., 2016) and to understand an entrepreneurial career it is vital to understand career experiences post entrepreneurship. This study advances knowledge on how entrepreneurs are likely to be rewarded after their careers in entrepreneurship upon re-entry into wage employment. The results indicate that entrepreneurship is likely to be an attractive career alternative if entrepreneurs gain generic knowledge and skills that are valued by future employers.

Second, this study compliments existing studies in entrepreneurship (e.g. Bruce & Schuetze, 2004; Campbell, 2013; Luzzi & Sasson, 2016) to examine how over time, human capital influences the returns from entrepreneurship that are likely to differ based on the number of years in entrepreneurship and the number of spells in

entrepreneurship. The effect of how time spent in a particular state influences subsequent careers has received significant attention in career research (Carroll & Mosakowski, 1987; Czafit & Köllö, 2015; Kroft et al., 2013), but very little attention in entrepreneurship research (see Manso, 2016).

Consistency appears to be important in entrepreneurship when returning to employment. The results show a strong positive effect of duration in entrepreneurship but a negative one for number of spells. This suggests that future employers view longer durations in entrepreneurship as a labor market activity that helps entrepreneurs develop knowledge and skills that are valued in paid employment. For example, the generic human capital (e.g. management skills), the social networks of the entrepreneurs and the self-driving ability of entrepreneurs help entrepreneurs obtain higher wages upon re-entering paid employment. However, future employers are likely to penalize career breaks in entrepreneurship that imply negative signals in the job market. This suggests that future employers view a longer duration as “consistency” in a career, while a larger number of spells is viewed as “inconsistency” where entrepreneurs move in and out of entrepreneurship.

This research also has implications for public policy. By celebrating entrepreneurs as job creators, policy makers openly pursue policies that encourage entrepreneurship. As a typical welfare state economy, Sweden’s employees typically receive generous social benefits (Korpi, 2006). Venturing into entrepreneurship from paid employment implies higher opportunity costs in terms of loss of social benefits. Additionally, after its worst economic recession in 1990, Sweden moved from a highly regulated economy favoring large firms, towards an economy favoring startups. Sweden underwent extensive business reforms that created a more entrepreneurial business climate. Reforms included reducing barriers to entry, flexibility on corporate ownership and a reduction in corporate taxes (from 52 percent in 1970s to 28 percent in 1994) (Andersson, Heyman, Norbäck, & Persson, 2016). During the period following 1991, the tax on personal income ranged between 31 and 52 percent (Sørensen, 1994) suggesting higher taxes in paid employment compared to entrepreneurial income. It is fair to assume that Swedish employees take advantage of these policy changes to venture into entrepreneurship.

The findings of this study provides insights on how policy makers could encourage entrepreneurs to spend longer times in entrepreneurship, which can help them hone newer skills from their entrepreneurial careers. Developing entrepreneurial skills could likely be valued across their careers in paid employment.

## Limitations

There are limitations to this study. They also constitute promising directions for future research. First, this study restricts the sample to one cohort of STLTF employees with a new job in 1991. While this is necessary to reduce unobserved heterogeneity, it yields results that are likely to be different had the study considered the whole population of full-time employed, unemployed, and part-time employed people in Sweden. This is likely to influence the results on re-entry into paid employment.

Second, this study used a matching approach that has an important limitation, since the intention to become an entrepreneur is not an exogenous event (Manso, 2016). Research suggests that entrepreneurs are not drawn at random, they are more likely to be employees with lower wages, male, “misfits”, middle-aged, and from smaller firms (see for e.g. Evans & Leighton, 1989; Kacperczyk & Marx, 2016; Åstebro et al., 2011). They might select self-employment, because they are bad employees. The question of how much of these differences reflect the causal effect of experience in entrepreneurship, and not self-selection, is not an easy one to answer. Although this study uses a list of observable characteristics to match individuals to reduce the endogeneity concern, this study acknowledges the absence of exogenous variation to entrepreneurial entry and its subsequent re-entry, making the results subject to endogeneity bias. They should therefore be interpreted with caution.

Third, this study follows prior studies to use human capital theory to theorize how the time spent in entrepreneurship is likely to influence subsequent wages in paid employment. However, research suggests that employer characteristics can confound the human capital of the individuals affecting employee productivity thereby affecting their wages (Burton et al., 2017; Elfenbein et al., 2010; Sørensen, 2007). Future studies could investigate how employer characteristics (e.g. bureaucracy) could reward ex-entrepreneurs differently for their entrepreneurial experiences.

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## Paper IV





# Bureaucracy and Returns from Entrepreneurship among the Science & Technology Labor Force (STLF) in Sweden

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## Abstract

An important question in entrepreneurship research is to understand the returns from entrepreneurship. How much entrepreneurs benefit from an experience in entrepreneurship upon returning to employment is an important question to answer to understand the career value of engaging in entrepreneurship. Results have been inconclusive thus far however. Using a bureaucratic division of labor as the main theoretical foundation, this study investigates how an important employer characteristic – bureaucracy – prior to entrepreneurial entry and post entrepreneurship influences the wages of entrepreneurs upon re-entry into paid employment. Following a sample of 34,668 STLF individuals from Sweden between 1990 and 2008, results indicate that upon re-entry into paid employment, ex-entrepreneurs, relative to wage employees with similar observational

characteristics, earn lower wages in very small firms, but relatively larger wages in medium-sized and larger firms. Additionally, entrepreneurs who were employed as non-managers prior to entry and/or who were employed as non-managers upon re-entry into paid employment, earn lower wages relative to similar employees without entrepreneurial experience, but managers seem to benefit more in terms of higher wages after an entrepreneurial experience.

**Keywords:** Bureaucracy, division of labor, returns from entrepreneurship, STLF

## Introduction

In entrepreneurship research, there has been a growing interest in investigating returns from entrepreneurship for entrepreneurs re-entering paid employment following an experience in entrepreneurship (e.g. Daly, 2015; Evans & Leighton, 1989; Luzzi & Sasson, 2016). However, results have so far been mixed, with either positive (e.g. Luzzi & Sasson, 2016) or negative (e.g. Bruce & Schuetze, 2004; Kaiser & Malchow-Møller, 2011) returns. We still cannot say with certainty whether entrepreneurship pays or not. Additionally, extant research largely uses human capital theory as the main theoretical foundation to investigate the differences in wages of ex-entrepreneurs and employees. Research suggests that worker human capital can confound the firm characteristics given that firms of different sizes draw from somewhat different labor pools. Firms seek employees with capabilities appropriate to their local environment (Burton, Dahl, & Sorenson, 2017). Larger, older and often more bureaucratic firms, demand different employee skills and knowledge that could influence how entrepreneurs develop their human capital from entrepreneurship (Elfenbein, Hamilton, & Zenger, 2010; Kacperczyk & Marx, 2016).

On one hand, more bureaucratic organizations are characterized by a detailed division of labor (Weber, 1922) requiring employees to be specialized in skills that are more suited for the internal production processes of the firm. On the other hand, smaller and less bureaucratic firms require their employees to have more generic skills (Kacperczyk & Marx, 2016). Furthermore, differences in job characteristics within organizations are likely to arrange employees into different positions, grouping employees with similar skills and knowledge. Employees at lower positions are likely to be endowed with skills and knowledge different from employees at higher level positions (Kurke & Aldrich, 1983; Mintzberg, 1980). As entrepreneurship is a labor market activity that requires more generic skills than specific skills (Lazear, 2005), the entrepreneur's skills can either appreciate or depreciate depending on his employer characteristics and the employment position. The entrepreneur's employer characteristics and organizational position could

thereby influence the wages of ex-entrepreneurs re-entering paid employment in two ways.

First, research in entrepreneurship suggests entrepreneurs inherit blueprints in terms of capabilities, resources and job characteristics from their prior employment that influence how they perform in entrepreneurship (e.g. Baron, Burton, & Hannan, 1996; Baron, Hannan, & Burton, 2001; Campbell, Ganco, Franco, & Agarwal, 2011; Feldman, Ozcan, & Reichstein, 2019). An entrepreneur's employer heterogeneity in terms of size and age prior to entry into entrepreneurship, and their prior positions, could influence the knowledge and skills entrepreneurs gain from entrepreneurship that could extend beyond entrepreneurship upon re-entering paid employment. Second, an entrepreneur's re-entering employer heterogeneity in terms of size and age and their organizational re-entry position could influence how entrepreneurs are rewarded upon re-entry into paid employment.

I build on this understanding to investigate how an important organizational characteristic – bureaucracy<sup>1</sup> – influences returns from entrepreneurship. Specifically, using the division of labor as the key theoretical framework, this study investigates how the bureaucracy of the entrepreneur's employer prior to entry into entrepreneurship and bureaucracy of the entrepreneurs' employer upon re-entry into paid employment influence the returns from entrepreneurship for entrepreneurs re-entering paid employment following an experience in entrepreneurship, compared to matched employees with similar observational characteristics with no entrepreneurial experience. Additionally, this study investigates how the wages of ex-entrepreneurs are likely to differ based on their organizational rank (managers versus non-managers) prior to entry into entrepreneurship and their organizational rank upon re-entry into paid employment. The division of labor (Weber, 1922) groups employees based on skills and arranges them based on their ranks in an organization.

I use a Entropy Balanced (EB) (Hainmueller, 2012) matching algorithm on a matched employee-employer register data to study a sample of STL<sup>2</sup> employees from Statistics Sweden from 1990 to 2008. I sample STL employees who had new jobs in 2001 (34,668 individuals) and track their labor market transitions from wage employment into incorporated entrepreneurship<sup>3</sup> and back into wage employment. Bureaucracy not being directly measurable, I follow prior studies to use firm size, firm age and firm layers (Sørensen, 2007; Tåg, Åstebro, & Thompson, 2016)

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<sup>1</sup> Increased role differentiation and specialization within the organization Weber, M. 1924. Legitimate Authority and Bureaucracy. In D. Pugh (Ed.), *Organization Theory Selected Classic Readings*, 2007 ed.: Penguin Books.

<sup>2</sup> Labor force educated in Science, Technology, Engineering and Mathematics (STEM)

<sup>3</sup> I focus exclusively on transitions into incorporated entrepreneurship as this ensures a better proxy for entrepreneurship (Levine, R., & Rubinstein, Y. 2017).

as proxies for bureaucracy, to investigate the wages of ex-entrepreneurs by comparing them with matched workers who do not experience any period of entrepreneurship. A focus on a sample of STLF employees with similar educations and a matching methodology that compares ex-entrepreneurs with employees of similar observational characteristics helps properly identify causal self-employment effects on subsequent returns from entrepreneurship. Such a method helps identify the causal effect of entrepreneurship upon re-entry, by teasing out effects due to the self-selection of entrepreneurs entering entrepreneurship and the effect of entrepreneurship itself (Elfenbein et al., 2010). Individuals who self-select into entrepreneurship are more likely to be male, middle-aged, earn lower wages, be from smaller firms, and be “misfits” (see Evans & Leighton, 1989; Kacperczyk & Marx, 2016 ; Åstebro, Chen, & Thompson, 2011). Additionally, a focus on incorporated entrepreneurship is likely to have homogeneity in the sample, by not mixing “Michael Bloomberg and a hot dog vendor” (Levine & Rubinstein, 2017).

The results of this study indicate that upon re-entry, ex-entrepreneurs, relative to matched employees, have negative wages in very small firms (less than 10 employees), increasing to positive for medium sized firms (51-500 employees) and reducing (but positive) for larger firms (more than 500 employees), suggesting an inverted U-shaped relationship between re-entry firm size and returns from entrepreneurship. The results also suggest that being employed as a manager prior to entry into entrepreneurship and being employed as a manager on re-entry has positive returns from entrepreneurship relative to matched employees.

This study has important contributions to research on returns from entrepreneurship. First, existing studies largely use human capital theory as the key theoretical foundation to examine wages upon re-entry. This study complements the existing studies of (e.g. Kaiser & Malchow-Møller, 2011; Luzzi & Sasson, 2016) by examining how the division of labor (Weber, 1922) of the entrepreneurs’ employer prior to entry into entrepreneurship as well as the employer upon re-entry are likely to confound the human capital of entrepreneurs, which is likely to influence their returns from entrepreneurship. Second, this study contributes to our understanding of the relationship between bureaucracy and entrepreneurship by explaining how the division of labor in bureaucratic organizations shapes wages following experiences in entrepreneurship – such as founding a business (Toft-Kehler, Wennberg, & Kim, 2014). Bureaucracies are an important part of the labor market, providing career opportunities, higher wages relative to smaller, less bureaucratic firms and are attractive to employers (Even & Macpherson, 2012; Kalleberg & Van Buren, 1996). Third, this study provides an empirical contribution by investigating the highly skilled STLF finding a significant interest in entrepreneurship research (e.g. Delmar, Wennberg, & Hellerstedt,

2011; Fairlie & Chatterji, 2013; Stenard & Sauermann, 2016). Literature in entrepreneurship however, largely focuses on the entrepreneurial entry of this highly skilled workforce (e.g. Braguinsky, Klepper, & Ohyama, 2012; Stenard & Sauermann, 2016) largely ignoring how they fare as employees upon their return to paid employment – which is where the majority of entrepreneurs end up. By investigating the wages of highly skilled workers relative to their matched counterparts in wage employment, this study contributes to our understanding of the returns from entrepreneurship of highly skilled STLF employees who re-enter wage employment following a career in entrepreneurship.

## Theory & Hypotheses Development

Human capital theory has received significant attention in entrepreneurship research (Marvel, Davis, & Sproul, 2016) and has been the main theoretical foundation of previous research (e.g. Bruce & Schuetze, 2004; Campbell, 2013; Kaiser & Malchow-Møller, 2011) examining the returns from entrepreneurship following an entrepreneurial experience. Broadly, the studies investigate how the wages of ex-entrepreneurs is likely to be influenced by the human capital gained by entrepreneurs from their entrepreneurial experience. Ideally, human capital theory provides a relevant framework for developing the hypotheses.

Although human capital theory (Becker, 1964; Mincer, 1974) provides a basic understanding of the wages of an employee, the literature suggests that firm characteristics can confound the human capital of the individuals, which is likely to affect the productivity of the employees, in turn influencing their wages (Burton et al., 2017; Elfenbein et al., 2010; Sørensen, 2007). Bureaucratic organizations – characterized by division of labor (Weber, 1922) – have different skill requirement than less bureaucratic organizations. The formal division of labor favors specialized skills, over generic skills, which are likely to be suited to the production processes of the firm (Weber, 1946). I propose two key arguments based on this understanding.

First, I argue that upon re-entry into wage employment, the wages of ex-entrepreneurs are likely to be influenced by the bureaucratic nature of the employer. The different skill requirement of bureaucratic organizations, relative to less bureaucratic organizations is likely to influence employee productivity (Kacperczyk & Marx, 2016; Kalleberg & Van Buren, 1996; Sørensen, 2007), which is in turn likely to influence the wages of ex-entrepreneurs. This indicates that based on their bureaucratic nature, firms are likely to differ in their skill requirements and hence would differ in rewarding employees' talents. Firms provide higher wages to



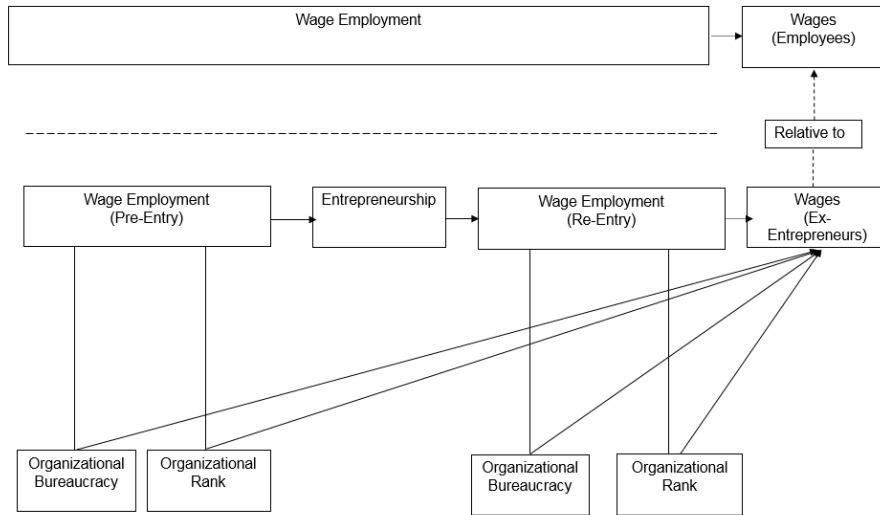
employees who are likely to add value to the firm, while providing lower wages to employees who create less value for the firm (Bloom & Michel, 2002; Blyler & Coff, 2003; Carnahan, Agarwal, & Campbell, 2012).

Second, I argue that the wages of ex-entrepreneurs who re-enter wage employment post entrepreneurship is contingent on the bureaucratic nature of the employer prior to entry into entrepreneurship. A recurrent finding in entrepreneurship literature suggests that employees from smaller firms, generally less bureaucratic, develop knowledge and skills that are well-suited to entrepreneurship, contrary to the skills developed by employees in large bureaucratic firms (Kacperczyk, 2012; Sørensen, 2007; Tåg et al., 2016). This suggests that entrepreneurs coming from wage employment are likely to match differently to entrepreneurship based on the bureaucratic nature of their employer prior to entry into entrepreneurship. Contingent on the bureaucratic nature of the employer prior to their entry into entrepreneurship, entrepreneurs are likely to either appreciate or depreciate the skills they gained in prior employment. Upon moving back into paid employment, the skills gained in entrepreneurship are likely to influence wages upon re-entry into paid employment.

Additionally, the formal division of labor arranges employees based on their organizational rank (Weber, 1922). Employees have responsibilities that allow them to focus on certain kinds of work (Blau, 1970), endowing them with skills depending on their organizational rank. Employees in higher ranks, such as managers, are likely to have skills different from employees in lower ranks, such as production workers (broader skills such as leadership and customer management). Intuitively, the organizational rank of the entrepreneur prior to entry into entrepreneurship is likely to either appreciate or depreciate their skills from their entrepreneurial experience, which is likely to affect their wages upon re-entry into wage employment. In a similar vein, upon re-entry into paid employment, wages for entrepreneurs moving into managerial positions are likely to be different than wages for entrepreneurs moving into non-managerial positions. This suggests that upon re-entry into wage employment, the wages of entrepreneurs are likely to depend on their organizational rank prior to entry into entrepreneurship and the organizational rank upon re-entry into paid employment.

In summary, organizational bureaucracy and the organizational rank of the ex-entrepreneur, both prior to entry into entrepreneurship and upon re-entry into paid employment, are likely to have an influence on their skills, which in turn is likely to influence the wages of ex-entrepreneurs who re-enter paid employment relative to employees who do not experience any period of entrepreneurship. Upon re-entering paid employment, the wages of ex-entrepreneurs are likely to be dependent on the match of the skills gained from the entrepreneurial experience and the skill requirements of the firm upon re-entry. Additionally, experience gained during entrepreneurship is likely to either appreciate or depreciate the prior human capital from paid employment, influencing wages upon re-entry.

In Figure 1, I present a simple model that guides the reader to the overall idea of this study. The top part of the figure (above the dotted line) depicts the wages of employees who do not experience any period of entrepreneurship. The bottom part of the figure (below the dotted line) depicts the wages of ex-entrepreneurs who re-enter paid employment contingent on the bureaucracy of their employer and their organizational rank prior to entry into entrepreneurship, and the bureaucracy of their employer and their organizational rank upon re-entry into paid employment.



**Figure 1**  
A Simple Model

## Re-entry Bureaucracy and Re-entry Wages

Numerous studies have examined the rewards associated with working for large as opposed to small firms (e.g. Cobb & Lin, 2017; Kalleberg & Van Buren, 1996; Stolzenberg, 1978). A broad conclusion is that larger firms, generally assumed to be more bureaucratic, pay higher wages than smaller firms – a phenomenon referred to as firm size wage premium (Cobb & Lin, 2017). Although there is a general understanding that compared to smaller firms, larger firms pay higher wages, Burton et al. (2017) argued that worker human capital can confound the firm characteristics given that firms of different sizes draw from somewhat different labor pools. Firms seek employees with appropriate capabilities that fit the local environment.

The literature suggests that firms are likely to differ based on their bureaucratic nature. On one hand, more bureaucratic organizations, characterized by high

complexity and differentiation that implies a detailed division of labor (Weber, 1922), require that employees specialize in skills that are more suited towards the complex production processes of the firm (Blau & Schoenherr, 1971; Kalleberg & Van Buren, 1996). Additionally, Sørensen (2007) suggests that bureaucracies reward employees based on the depth of their skills rather than the breadth. On the other hand, less bureaucratic firms are characterized as having limited resources, less stable structures and less developed internal labor markets (Baum & Oliver, 1992; Stam, Arzlanian, & Elfring, 2014; Stinchcombe, 1965). They require employees that perform a wider range of jobs and tasks, and have knowledge in a variety of functional areas. Less bureaucratic firms are characterized by flexible structures emphasizing the generalizability of employee skills in varied roles, commercial activities and employee knowledge in a variety of functional areas (Kacperczyk & Younkin, 2017).

Entrepreneurship involves the development of skills that are more generic in nature. Entrepreneurs are likely to develop varied skills that include not only application knowledge, but also management skills (Lazear, 2004; Lazear, 2005). Individuals engaging in entrepreneurship are hence more likely to develop broader skills such as supervision, the recruitment of employees as well as the technical knowhow of the entrepreneurial idea. Upon moving back into paid employment, entrepreneurs are likely to be more productive where their skills find a better match in the employing firm. Workers who are better matched with their jobs are likely to be more productive than workers who are less well matched with their jobs (Jovanovic, 1979).

Ex-entrepreneurs, relative to employees who remain in wage employment, are likely to gain more generic skills from their experience in entrepreneurship, such as broad management skills and a new knowledge of how to raise capital. Whereas those who remain in paid employment are more likely to be limited to their skills in wage employment. As entrepreneurs are likely to develop skills and knowledge from their experience in entrepreneurship, the value of the skills gained in entrepreneurship is likely to differ based on the bureaucratic nature of the firm upon re-entry.

As less bureaucratic firms are characterized by skills that demand knowledge in broad functional areas, ex-entrepreneurs are likely to find a better match for their skills in these kinds of firms rather than more bureaucratic firms that generally require more specialized skills. This suggests that ex-entrepreneurs, endowed with skills and knowledge from their entrepreneurial experience are likely to find a better match in less bureaucratic firms than more bureaucratic firms and hence be more productive (Jovanovic, 1979) thus suggesting higher wages for ex-entrepreneurs.

In more bureaucratic firms, characterized by the rigid structures and formal division of labor (Sørensen, 2007; Weber, 1946), employers expect employees to be skilled and trained in their internal production processes. Ex-entrepreneurs, moving back

into more bureaucratic firms are likely to be less well matched due to more generic skills being gained from their entrepreneurial experience and hence be less productive, thus suggesting lower wages for ex-entrepreneurs. Thus:

H1a: With increasing bureaucracy of the firms upon re-entry, ex-entrepreneurs are likely to have lower wages relative to employees without any entrepreneurial experience

## **Pre-entry Bureaucracy and Re-entry Wages**

Building on the understanding that firms differ based on employee skill characteristics, extant literature in entrepreneurship recognizes that larger firms, in general being more bureaucratic, hinder the skills suited for entrepreneurship while employees from smaller, less bureaucratic organizations develop knowledge and skills that are well-suited for entrepreneurship (Elfenbein et al., 2010; Kacperczyk, 2012; Sørensen, 2007; Tåg et al., 2016). The division of labor (Weber, 1922) in more bureaucratic organizations makes employees specialized in their skills relative to less bureaucratic organizations. Intuitively, employees venturing into entrepreneurship are likely to differ based on the bureaucratic nature of their employer prior to entry into entrepreneurship.

Literature indicates entrepreneurship to be a labor market activity that is different from paid employment (Sørensen & Sharkey, 2014). Entrepreneurship requires more generic skills than specialized skills (Lazear, 2004). Entrepreneurs who venture into entrepreneurship from smaller, less bureaucratic firms are likely to be better matched to entrepreneurship relative to entrepreneurs who venture into entrepreneurship from larger more bureaucratic firms. Individuals better matched to their jobs are likely to be more productive than individuals who have a worse match with their jobs (Jovanovic, 1979) and are thus more likely to appreciate their prior skills. Whereas those who are not well matched are more likely to depreciate their skills (Mincer & Ofek, 1982).

Entrepreneurs who enter into entrepreneurship from less bureaucratic organizations are more likely to appreciate their prior knowledge and skills, because their prior skills are more likely to be matched with entrepreneurship. These entrepreneurs are therefore likely to gain newer skills from entrepreneurship such as supervision, employee recruitment, as well as technical entrepreneurial knowhow. On the other hand, individuals who remain in wage employment are likely to appreciate their skills limited to wage employment due their job market experience.

Upon re-entry into wage employment, entrepreneurs who were employed in less bureaucratic firms are likely to earn higher wages than employees who remained in wage employment. In a similar vein, entrepreneurs who were employed in more bureaucratic firms in wage employment prior to venturing into entrepreneurship, are

likely to draw lower wages relative to employees who remain in wage employment. Thus:

H1b: The more bureaucratic the firms prior to entry into entrepreneurship, the lower the wages for ex-entrepreneurs relative to employees without entrepreneurial experience.

## **Organizational Rank and Re-entry Wages**

In addition to influencing the skills of employees, the division of labor (Weber, 1922) arranges employees based on their organizational ranks where employees are grouped based on similarities in their job characteristics (Blau, 1970). Employees in higher ranks are likely to have skills and knowledge different from the skills and knowledge of the lower ranked employees. Mintzberg (1980) suggests employees can be grouped into two broad categories – non-managers and managers. On the one hand, non-managers are likely to have more specialized skills such as being responsible for implementing the day-to-day production activities of the organization. On the other hand, managers are likely to have more generic skills such as coordination and the general management of daily activities in the organization.

An experience in entrepreneurship is likely to endow entrepreneurs with more generic skills and knowledge (Lazear, 2004; Lazear, 2005). Upon re-entry into wage employment, entrepreneurs moving into managerial positions are likely to find their skills better matched in such positions. However, employees with no entrepreneurial experience are likely to be limited to the skills they develop in wage employment.

Similarly, entrepreneurs who move into non-managerial positions are less likely to find their skills matched to wage employment and are hence likely to draw lower wages relative to employees who do not experience any period of entrepreneurship. Stated formally:

H2a: Upon re-entry into wage employment, ex-entrepreneurs moving in as managers (non-managers) are likely to have higher (lower) wages relative to employees without any entrepreneurial experience.

In a similar vein, ex-entrepreneurs who were managers prior to entry into entrepreneurship are more likely to have generic skills from their employment experience. Upon entry into entrepreneurship, managers were likely to appreciate (Mincer & Ofek, 1982) their skills and knowledge from their entrepreneurial experience. Upon re-entry into wage employment, entrepreneurs who were managers in prior wage employment were likely to be endowed with skills and knowledge from their entrepreneurial experience. However, employees with no entrepreneurial experience were likely to be limited to the skills and knowledge they

gained in wage employment. This suggests ex-entrepreneurs are likely to have higher wages relative to employees with no entrepreneurial experience.

Intuitively, non-managers are more likely to have specialized skills from their employment experience that are less likely to be matched with entrepreneurship, thereby depreciating their skills in entrepreneurship. They are therefore less likely to be rewarded for their skills upon re-entry into wage employment, suggesting lower wages.

H2b: Upon re-entry into wage employment, ex-entrepreneurs who were managers (non-managers) in prior wage employment, are likely to have higher (lower) wages relative to employees without any entrepreneurial experience.

## Sample & Method

This study investigates the hypotheses using a linked employee-employer dataset provided by Statistics Sweden (SCB) consisting of the STLF in Sweden from 1990-2008. The data provides codes that help identify STLF employees, in order to group individuals based on their education: consisting of scientists, technologists, engineers and mathematicians and education levels (Bachelors/Masters/PhD).

I build the sample in the following two steps. First, I include employees with a new job in 2001. A new job in 2001 ensures that these employees had no prior experience in the focal firm and enables estimates of similar employees (Burton et al., 2017). It also reduces biasing due to left censoring (Yang & Aldrich, 2012). A focus on a homogenous sample of the STLF with a new job differs from prior studies such those of Kaiser and Malchow-Møller (2011) and Luzzi and Sasson (2016) in that their studies is likely to include employees with varying tenures in wage employment prior to their entry into entrepreneurship. Including employees with varying tenures is likely to have a different influence on wages in subsequent wage employment.

Second, I follow these employees' transitions into incorporated entrepreneurship from wage employment and re-entry into wage employment from incorporated entrepreneurship between 2003 and 2008. A focus exclusively on incorporated entrepreneurship provides a better proxy for entrepreneurship, as such entrepreneurship is likely to be associated with "Schumpeterian" entrepreneurship (Levine & Rubinstein, 2017). Additionally, Levine and Rubinstein (2017) suggest that individuals entering incorporated entrepreneurship are more likely to be engaged by individuals with higher education, thereby indicating incorporate entrepreneurship as a better proxy for employees from the STLF with higher education.

The research design of this study is limited however as this study cannot follow individuals who may have had a very small window of entrepreneurial experience (e.g. 6 months) because Statistics Sweden records occupation only once a year. This limitation is also indicated by other related studies that use similar datasets (e.g. Kaiser & Malchow-Møller, 2011; Luzzi & Sasson, 2016).

## **Data Descriptives**

To understand the underlying data, I provide descriptives for both, entry into entrepreneurship and re-entry into wage employment post entrepreneurship. I observe 2,736 transitions into incorporated entrepreneurship between 2002 and 2008. The total number of this study is significantly smaller than that of Kaiser and Malchow-Møller (2011) and is likely due to a restricted sample of STLF employees with new jobs in 2001 prior to entry into incorporated entrepreneurship. Additionally, I observe that between 2002 and 2008, there were 1,265 transitions into self-employment suggesting a larger number of transitions into incorporated entrepreneurship than into self-employment. Prior studies in entrepreneurship that focused on broad samples (e.g. Tåg et al., 2016) observe a larger number of transitions into self-employment than into incorporated entrepreneurship. A possible explanation for this differential observation is likely attributable to the highly educated STLF employees of this sample. Additionally, I observe that more men (82%) than women (18%), more scientists and engineers (total: 76%) than technologists (18.7%) and mathematicians (5.2%), transition into entrepreneurship. Furthermore, I observe that those transitioning into entrepreneurship are also more likely to be managers (81.32%), be from firms with 4 organization layers (28%) and be from firms with less than 10 employees (51%).

For re-entry into wage employment, I observe a total of 1,092 transitions back into wage employment between 2003 and 2008. This suggests 39.91% of the sample (1,092 re-entries out of 2,736 entries) transitioned back into wage employment after venturing into incorporated entrepreneurship. In their study, Kaiser and Malchow-Møller (2011) observe 50.8% of the entrepreneurs who ventured into entrepreneurship transitioned back into wage employment. A possible explanation for this differential observation is possibly attributable to the high opportunity costs involved with moving out of incorporated entrepreneurship for highly skilled STLF individuals.

Tables 1, 2, 3 and 4 provide a detailed analysis of employees' transitions prior to entrepreneurship and post entrepreneurship. For example, Table 1 presents the count of the employees who have moved from employers of various sizes prior to entrepreneurship into employers of different sizes post entrepreneurship. Similarly, Tables 2, 3 and 4 provide the number of employees based on their employer size, employer layers and ranks respectively.

**Table 1**

Employee movements prior to entry and on re-entry (based on employer size)

	<b>Less or equal to 10 emp.</b>	<b>11-50</b>	<b>51-500</b>	<b>501+</b>
Less or equal to 10 emp.	695	327	142	143
11-50 emp.	129	454	175	97
51-500 emp.	48	47	88	37
501+ emp.	169	34	23	143

**Table 2**

Employee movements prior to entry and on re-entry (based on employer age)

	<b>Less than 3 years</b>	<b>3-10 yrs.</b>	<b>11+ yrs.</b>
Less than 3 years	162	699	298
3-10 yrs.	100	744	273
11+ yrs.	27	114	234

**Table 3**

Employee movements prior to entry and on re-entry (based on employer layers)

	<b>Layers (2)</b>	<b>Layers (3)</b>	<b>Layers (4)</b>
Layers (2)	260	140	198
Layers (3)	49	169	186
Layers (4)	69	71	417

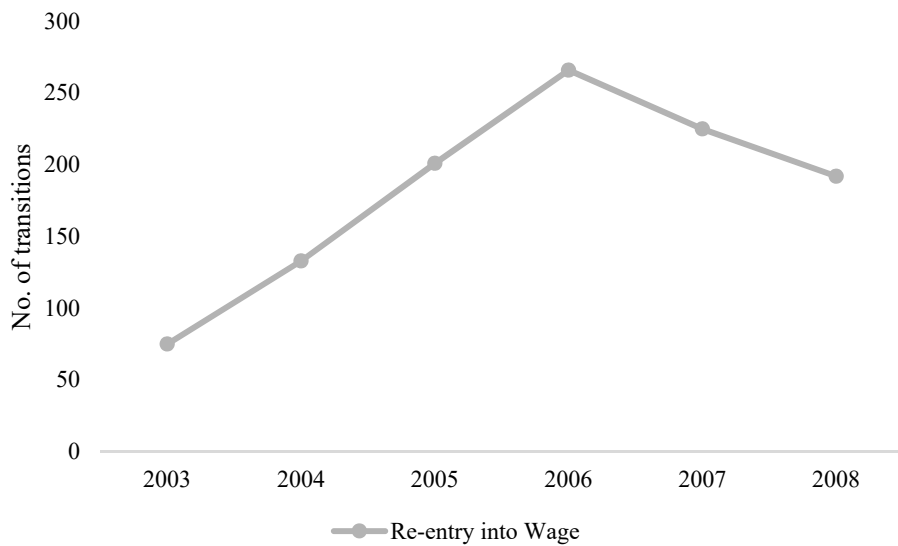
**Table 4**

Employee movements prior to entry and on re-entry (based on employer rank)

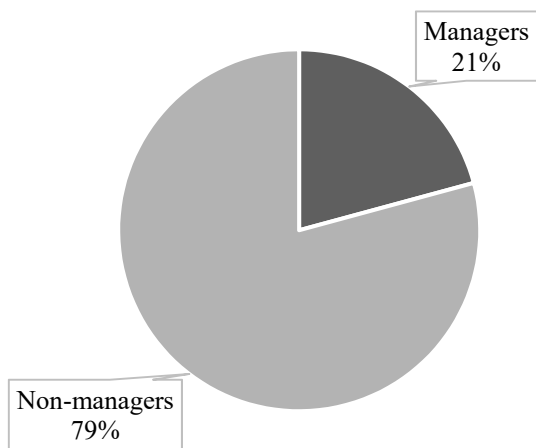
	<b>Non-managers</b>	<b>Managers</b>
Non-managers	1,934	181
Managers	200	336

Figure 2 plots of the number transitions into paid employment post entrepreneurship. For example, in 2003, there were a total of 58 re-entry transitions into paid employment post entrepreneurship. Figure 3 presents the number of entrepreneurs employed as managers and non-managers upon re-entry into paid employment.





**Figure 2**  
Re-entry transitions



**Figure 3**  
Ranks on Re-entry

## Description of Variables

### *Dependent variables*

*Wage (log)*: This research follows the studies of Kaiser and Malchow-Møller (2011), Luzzi and Sasson (2016) and Bruce and Schuetze (2004) to test the hypotheses on log transformed wages in subsequent wage employment.

### *Independent variables*

*Organizational bureaucracy*: I follow prior studies in entrepreneurship (Sørensen, 2007; Tåg et al., 2016) to use firm size, firm age and firm layers as proxies for bureaucracy.

For firm size, I use prior research (Burton et al., 2017; Pearson, Stringer, Mills, & Summers, 2006) to group firm size into various categories to examine effects for micro, small, medium and large firms. This variable is categorized as follows:  $\leq 10$  employees (micro), 11-50 employees (small to medium), 51-500 employees (small to medium), and 500+ employees (large). Similarly, for firm age, I create three categories – less than 3 years; 3 to 10 years; and more than 10 years. For firm layers, I measure the hierarchical nature of the firm by counting the number of distinct ranks in the firm. The number of distinct ranks represents the number of layers in the firm. For example if a firm has one CEO, one manager, one supervisor, and one production workers, the number of layers in the firm is four. However, for firms with one layer, I assign the highest paid employee as the CEO thus making firms have two, three or four layers (Tåg et al., 2016).

*Organizational Rank*: I use the occupational codes<sup>4</sup> provided by Statistics Sweden to categorize employees as managers (CEOs and senior staff) and non-managers (supervisors and production workers).

### *Control variables*

In addition to the dependent and independent variables, I control for the individual's age, gender (male/female), marital status (married/others), number of children, number of children under six, capital income, sector (categories) that the individual belongs to, scientists (binary coded 0 for non-scientist or 1 for scientist), technologists (binary coded 0 for non-technologist or 1 for technologist), engineers (binary coded 0 for non-engineer or 1 for engineer) and mathematicians binary coded 0 for non-mathematician or 1 for mathematician), PhD (binary coded 0 for non-PhD or 1 for PhD), living in Stockholm (binary coded as 1 for individuals living in the Stockholm commune or 0 for otherwise), tenure in wage employment prior to

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<sup>4</sup> Managers: CEOs (SSYK codes -121, 131, 111, 112), Senior staff (SSYK codes – 122, 123); Non-managers: Supervisors (SSYK codes – 200-399), Production workers (SSYK codes: 400-999) Tåg et al. (2016)

entry into entrepreneurship, income of the entrepreneur from entrepreneurship in the year prior to re-entry into paid employment, number of years spent in entrepreneurship, number of spells in entrepreneurship and the operating profit of the entrepreneur's firm in the year prior to re-entry into paid employment. Year, occupation and industry fixed effects are included to capture time, occupation and industry trends or shocks in the economy. Table 5 presents the summary statistics of the variables used in the study.

**Table 5**  
Summary Statistics

No. of Observations	243,185			
	Mean	SD	Min	Max
Wage (log)	8.27	0.60	0.69	12.5
Age	38.60	8.09	21	60
Gender(Male)	0.70	0.46	0	1
Married	0.52	0.50	0	1
Children	1.07	1.09	0	10
Children Under 6	0.51	0.78	0	5
Capital Income (log)	1.35	2.34	0	14.5
PhD	0.09	0.28	0	1
Stockholm County	0.20	0.40	0	1
Scientist	0.20	0.40	0	1
Technologist	0.15	0.35	0	1
Engineer	0.57	0.50	0	1
Mathematics	0.08	0.27	0	1
Prior Tenure	0.04	0.34	0	7
Duration in Entrepreneurship	0.02	0.20	0	6
Number of Spells in Entrepreneurship	0.01	0.11	0	2
Firm Age (categories)	2.46	0.67	1	3
Firm Size (categories)	3.30	0.91	1	4
Management Layers (categories)	3.72	0.58	2	4

## Empirical Strategy

The main objective of this study is to estimate the treatment effect of bureaucracy on the wages of entrepreneurs who re-enter wage employment prior to entry into entrepreneurship and upon re-entry into wage employment. To test the hypotheses, I follow similar studies in entrepreneurship (e.g. Daly, 2015; Kaiser & Malchow-Møller, 2011; Luzzi & Sasson, 2016) to use a matching methodology to estimate

the treatment effect of entrepreneurship by comparing wages of entrepreneurs re-entering paid employment with the wages of employees who do not experience any entrepreneurship based on observable characteristic. The matching method however does not provide a safeguard against bias due to unobservable characteristics, a problem that has been acknowledged by prior entrepreneurship studies (e.g. Kaiser & Malchow-Møller, 2011). Research suggests that a technique to mitigate such a bias is to reduce the heterogeneity of the treatment and control groups (Angrist & Pischke, 2008). The homogenous sample of STLF employees in this research helps reduce heterogeneity, mitigating any bias attributable to the unobservable.

The matching methodology requires us to first identify appropriate treatment and control groups to provide the Average Treatment of the Treated (ATT) estimate of the treatment effect. To test hypotheses 1a, I create different treatment groups<sup>5</sup> identifying entrepreneurs based on firm size, firm age and firm layers upon re-entry (fig 4). For firm size, I create four treatment groups. Treatment group T1 for entrepreneurs moving to firms with 10 employees or less, treatment group T2 for entrepreneurs moving into firms with 11-50 employees, treatment group T3 for entrepreneurs moving into firms with 51-500 employees and treatment group T4 for entrepreneurs moving into firms with 500 employees or more. Similarly, I create appropriate treatment groups for firm size and firm layers. Similarly, to test hypothesis 1b, I create the same treatment groups based on the bureaucracy of the entrepreneur's employer prior to entry into entrepreneurship.

To test hypothesis 2a, I created two treatment groups. In one treatment group (T1), I group all entrepreneurs who are employed as non-managers upon re-entry into paid employment. In the other treatment group (T2), I group all the entrepreneurs who are employed as managers upon re-entry into paid employment. Similarly, to test hypothesis 2b, I create two treatment groups based on the organizational rank of the entrepreneur prior to entry into entrepreneurship. See Figure 5 for a graphic representation.

Additionally, to test all the hypotheses, I create one control group that consists of all the employees who do not experience entrepreneurship. Once the appropriate treatment groups are constructed, I follow recent research in entrepreneurship (e.g. Kwon & Ruef, 2017) to use the entropy balanced (EB) matching technique (Hainmueller, 2012) to generate balanced samples for the treatment and control groups based on age, gender, marital status, number of children, children under six, sector, PhD, residence in the Stockholm municipality, capital income, area of education (scientist/technologist/engineer/mathematics), firm size, firm age, firm layers, occupation (3 digit), and industry (2 digit). The EB technique has advantages over other matching methods such as Propensity Score Matching (PSM) by

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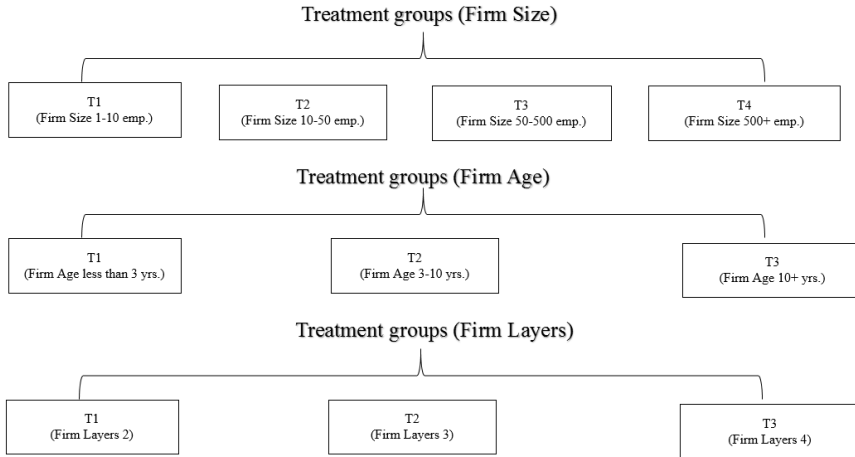
<sup>5</sup> This strategy is similar to Kaiser U & Machlow-Møller, N (2011) who refine the treatment groups based on the sector affiliations of ex-entrepreneurs prior to entry into self-employment and upon entry into wage employment.

imposing a set of balance conditions to imply that the treated and the reweighted control group match as closely as possible (Hainmueller, 2012). The generation of a balanced sample ensures an unbiased estimate of the average treatment effect on the treated (ATT). Table 6 provides the basic descriptive statistics (Table 2) of the treatment and control groups. Once the balanced sample is obtained after the matching algorithm, I run OLS regression using the weights provided by the EB algorithm to obtain unbiased estimates of the ATT.

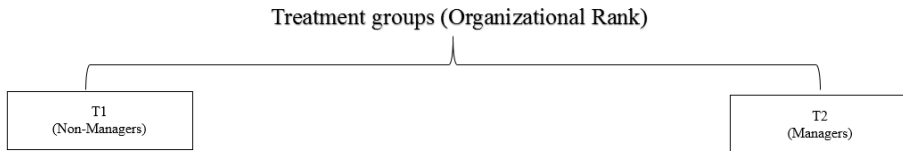
**Table 6**  
Matching Descriptives<sup>6</sup>

	Before Matching				After Matching	
	Treatment		Control		Treatment & Control	
	(Mean)	(Variance)	(Mean)	(variance)	(Mean)	(Variance)
Age	42.19	56.11	38.65	64.95	42.19	56.11
Gender	0.80	0.15	0.70	0.21	0.80	0.15
Married	0.68	0.21	0.52	0.25	0.68	0.21
#Children	1.37	1.18	1.07	1.18	1.37	1.19
Children Under Six	0.57	0.65	0.51	0.60	0.57	0.65
Scientist	0.21	0.17	0.20	0.16	0.21	0.17
Technologist	0.20	0.16	0.14	0.12	0.20	0.25
Engineer	0.52	0.25	0.56	0.24	0.52	0.06
Mathematician	0.06	0.06	0.08	0.07	0.06	0.05
PhD.	0.06	0.05	0.09	0.08	0.06	0.06
Stockholm County	0.22	0.17	0.20	0.16	0.22	0.17
Capital Income (log)	2,972	12.52	1,336	5.41	2,972	12.52
Organizational Rank	1.48	0.69	1.08	0.21	1.48	0.69
Employer Age	2.06	0.37	2.48	0.43	2.06	0.37
Layers	1.56	0.59	2.72	0.33	1.56	0.59

<sup>6</sup> The table represents descriptives for treatment group of firm size (less than 10 employees) on re-entry. The other matching descriptives for other treatment and control groups are unreported here to maintain brevity, but can be obtained from the author.



**Figure 4**  
Treatment Groups of H1a and H1b



**Figure 5**  
Treatment Groups for H2a and H2b Results

## Re-entry Bureaucracy and Returns from Entrepreneurship

Hypothesis (H1a) predicts that with increasing bureaucracy of the re-entering firm, wages are likely to decrease for ex-entrepreneurs relative to matched employees. Tables 7, 8 and 9 presents the ATT estimation results for the various treatment groups based on firm size, firm age and firm layers of the re-entering firm and the control group of matched employees using OLS regression with the weights of the EB algorithm.

For firm size (Table 7, column 1), the results suggest that relative to employees with no entrepreneurial experience, entrepreneurs re-entering wage employment have negative returns (-0.06;  $p < 0.05$ ) for firms with 10 employees or less, positive returns (0.01; n.s.) for firms with 11-50 employees, even more positive returns (0.09;  $p < 0.001$ ) for firms with 51-500 employees but reducing to 0.06;  $p < 0.05$  positive

returns for firms with more than 500 employees. The results suggest that post entrepreneurship, moving into micro firms with less than ten employees will earn a re-entering employee 6% lower wages compared to matched employees. However, upon re-entering a firm with 50-500 employees, ex-entrepreneurs earn 9% higher than matched employees but subsequently reducing (but positive) to 6% for entrepreneurs re-entering firms with more than 500 employees. I observe similar trends (column 2) controlling for observables at individual, firm and industry levels.

**Table 7**  
Results Hypothesis 1a (Firm Size)

Treatment Groups	Control Group of	
	Matched Employees in Wage Employment (N=230,455)	
	ATT (1)	ATT with controls (2)
T1 (Re-entry size: less than 10 emp.) (N=1,041)	-0.06* (0.02)	-0.10 (0.14)
T2 (Re-entry size: 11-50 emp.) (N=862)	0.01 (0.02)	0.17 (0.10)
T3 (Re-entry size: 51-500 emp.) (N=428)	0.09*** (0.02)	0.44*** (0.12)
T4 (Re-entry size: 501+ emp.) (N=420)	0.06* (0.03)	0.29* (0.14)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income, Firm Age (categories), Layers (categories), Rank, Industry (categories), Occupations (categories), Year, Previous income, duration in entrepreneurship, number of spells in entrepreneurship, operating profit, industry switch. Standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

For firm age (Table 8, column 1), the results suggest that relative to employees with no entrepreneurial experience, entrepreneurs re-entering wage employment have negative returns (-0.01; n.s.) for firms less than 3 years of age, increasing to positive returns (0.05; p<0.05) for firms 3-10 years of age and subsequently falling (but still positive returns) to 0.04 (p<0.05) for firms older than 10 years. In column 2, I present the ATT effects controlling for observables at the individual, firm and industry level variables.

**Table 8**  
Results Hypothesis 1a (Firm Age)

Treatment Groups	Control Group of Matched Employees in Wage Employment (N=230,455)	
	ATT	ATT with controls
	(1)	(2)
T1 (Re-entry firm age: less than 3 years) (N=289)	-0.01 (0.04)	-0.06 (0.14)
T2 (Re-entry firm age: 3-10 years) (N=1,557)	0.05** (0.02)	0.11 (0.10)
T3 (Re-entry firm age: 11+ years) (N=805)	0.04* (0.02)	0.22* (0.10)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income, Firm Size (categories), Layers (categories), Rank, Industry (categories), Occupations (categories), Year, Previous income, duration in entrepreneurship, number of spells in entrepreneurship, operating profit, industry switch. Standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

For firm layers (Table 9, column 1), the results suggest that relative to employees with no entrepreneurial experience, entrepreneurs re-entering wage employment have negative returns (-0.06; p<0.05.) for firms with 2 layers, increasing to positive returns (0.05; n.s) for firms with 3 layers and further increasing to 0.07 (p<0.001) for firms with 4 layers. In column 2, I present the ATT effects controlling for observables at individual, firm and industry level variables.

**Table 9**  
Results Hypothesis 1a (Firm Layers)

Treatment Groups	Control Group of Matched Employees in Wage Employment (N=237,043)	
	ATT	ATT with controls
	(1)	(2)
T1 Re-entry Layers (2) (N=378)	-0.05* (0.02)	-0.30* (0.13)
T2 Re-entry Layers (3) (N=388)	0.05 (0.02)	0.24* (0.11)
T3 Re-entry Layers (4) (N=801)	0.07*** (0.02)	0.31*** (0.09)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income, Firm Age (categories), Firm Size (categories), Rank, Industry (categories), Occupations (categories), Year, Previous income, duration in entrepreneurship, number of spells in entrepreneurship, operating profit. Standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05.



In summary, for the three measures of bureaucracy, the results are mixed with no consistent trends in the direction of the coefficients. Specifically, for firm size and firm age, results indicate that the returns are negative for very small firms (10 employees or less) and younger firms (less than 3 years of age), subsequently increasing and positive for mid-sized firms (51-500 employees) and firms 3-10 years of age and subsequently decreasing (but staying positive) for larger (500+ employees) and older firms (10+ years). This indicates that very small and younger firms, although being less bureaucratic, are unlikely to pay higher wages to ex-entrepreneurs relative to matched employees. However, firms with 51-500 employees are likely to value the skills and knowledge of ex-entrepreneurs providing higher wages relative to matched employees. A plausible explanation could be that larger firms, although being more bureaucratic and expecting employees to be more specialized, have better financial resources and could possibly risk hiring entrepreneurs for their skills and knowledge gained in entrepreneurship and provide them higher wages. For firm layers, the results suggest that the returns are negative for firms with flatter hierarchies (2 layers) while increasing for firms with 3 layers and further increasing for firms with 4 layers. This suggests more hierarchical firms pay higher wages to ex-entrepreneurs relative to firms with 2 and 3 layers. The mixed results therefore do not provide support to H1a, thereby rejecting the hypothesis.

## **Pre-entry Bureaucracy and Returns from Entrepreneurship**

Hypothesis (H1b) predicts that with increasing bureaucracy of the employer prior to entrepreneurship, entrepreneurs are likely to have lower wages relative to matched employees with no entrepreneurial experience. Tables 10, 11 and 12 present the ATT estimation results for the various treatment groups based on firm size, firm age and firm layers of the firm prior to entry into entrepreneurship and the control group of matched employees using OLS regression with the weights of the EB algorithm.

For firm size (Table 10, column 1), the results suggest that relative to employees with no entrepreneurial experience, entrepreneurs re-entering wage employment have negative returns (-0.04;  $p < 0.01$ ) for firms with 10 employees or less, increasing to positive returns (0.01; n.s) for firms with 11-50 employees and further increasing to 0.09;  $p < 0.01$  for firms with more than 500 employees. In column 2, I present the ATT effects controlling for observables at the individual, firm and industry level variables.

**Table 10**  
Results Hypothesis 1b (Firm Size)

Treatment Groups	Control Group of Matched Employees in Wage Employment (N=230,455)	
	ATT	ATT with controls
	(1)	(2)
T1 (Pre-entry size: less than or equal to 10 emp.) (N=1,307)	-0.04* (0.02)	0.04 (0.10)
T2 (Pre-entry size: 11-50 emp.) (N=855)	0.01 (0.02)	0.01 (0.13)
T3 (Pre-entry size: 51-500 emp.) (N=220)	0.07* (0.04)	0.00 (0.15)
T4 (Pre-entry size: 501+ emp.) (N=269)	0.09* (0.05)	0.34 (0.23)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income, Firm Age (categories), Layers (categories), Rank, Industry (categories), Year, Previous income, duration in entrepreneurship, number of spells in entrepreneurship, operating profit. Standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

For firm age (table 11, column 1), the results suggest that relative to employees with no entrepreneurial experience, entrepreneurs re-entering wage employment have positive returns (0.05; p<0.01) for firms less than 3 years of age, again positive (0.03; n.s.) but decreasing for firms 3-10 years of age, but negative (-0.00; n.s.) for firms older than 10 years. In column 2, I present the ATT effects controlling for observables at individual, firm and industry level variables.

**Table 11**  
Results Hypothesis 1b (Firm Age)

Treatment Groups	Control Group of Matched Employees in Wage Employment (N=230,455)	
	ATT	ATT with controls
	(1)	(2)
T1 (Pre-entry firm age: less than 3 years) (N=1,159)	0.05** (0.02)	-0.05 (0.12)
T2 (Pre-entry firm age: 3-10 years) (N=1,117)	0.03 (0.02)	0.17 (0.10)
T3 (Pre-entry firm age: 11+ years) (N=375)	-0.01 (0.03)	-0.04 (0.13)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income, Firm Size (categories), Layers (categories), Rank, Industry (categories), Occupations (categories), Year, Previous income, duration in entrepreneurship, number of spells in entrepreneurship, operating profit, industry switch. Standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

For firm layers (Table 12, column 1), the results suggest that relative to employees with no entrepreneurial experience, entrepreneurs re-entering wage employment have negative returns (-0.04; n.s.) for firms with 2 layers prior to entrepreneurial entry, positive returns (0.01; n.s.) for firms with 3 layers and increasingly positive returns (0.05;  $p<0.05$ ) for firms with 4 layers. In column 2, I present the ATT effects controlling for observables at individual, firm and industry level variables.

**Table 12**  
Results Hypothesis 1b (Firm Layers)

Treatment Groups	Control Group of Matched Employees in Wage Employment (N=237,043)	
	ATT	ATT with controls
	(1)	(2)
T1 Pre-entry Layers (2) (N=598)	-0.03 (0.02)	0.02 (0.10)
T2 Pre-entry Layers (3) (N=404)	0.01 (0.03)	0.04 (0.13)
T3 Pre-entry Layers (4) (N=557)	0.05* (0.02)	0.22* (0.11)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income, Firm Age (categories), Firm Size (categories), Rank, Industry (categories), Occupations (categories), Year, Previous income, duration in entrepreneurship, number of spells in entrepreneurship, operating profit. Standard errors are in parenthesis. \*\*\*  $p<0.001$ , \*\*  $p<0.01$ , \*  $p<0.05$ .

In summary, the results are mixed. For firm size and firm layers, the returns are negative for micro (less than 10 employees) and 2 layer firms and subsequently increasing and becoming positive for larger (500+ employees) and 4 layer firms. Larger and more hierarchical firms pay higher wages to ex-entrepreneurs relative to smaller and less hierarchical firms – a result contrary to the predication of hypothesis 2. A plausible explanation could be that although the division of labor in larger and more hierarchical firms is likely to specialize the skills of entrepreneurs, such bureaucratic firms are likely to provide better financial resources (Kalleberg & Van Buren, 1996) allowing such entrepreneurs to perform better in entrepreneurship, thereby appreciating their skills and providing higher wages upon re-entry. However, for firm age, the results indicate that being employed in young firms (less than 3 years of age) prior to entry into entrepreneurship is likely to provide positive returns, reducing to negative for those employed in older (10+ years of age) firms prior to entry. Although the direction of the coefficients follows the predictions of hypothesis 1b, the non-significance of the results provides no support for hypothesis 1b.

## Additional Analysis for Pre-Entry Bureaucracy and Re-Entry Bureaucracy

To further investigate the results of hypothesis 1a and hypothesis 1b, I create treatment groups for each proxy of bureaucracy, by combining employer characteristics prior to entry into entrepreneurship and employer characteristics upon re-entry into paid employment. For example, for firm size, I create one treatment group that consists of entrepreneurs who were employed in firms with less than 50 employees prior to entry into entrepreneurship and the same employees who moved into firms with less than 50 employees upon re-entry into paid employment. I create similar combined treatment groups for other combinations of firm size and firm layers. For firm size (Table 13), the results indicate that ex-entrepreneurs who were employed in large firms (500+ employees) prior to entry into entrepreneurship and move into smaller firms (less than 50 employees) earn 18% more than their matched counterparts. Similarly, for firm age (Table 14), the results suggest that ex-entrepreneurs who were employed in a firm of more than 10 years of age prior to entry into entrepreneurship and moved into younger firms (less than 3 years of age) earn 9% more than their matched counterparts. For firm layers (Table 15), the results suggest that ex-entrepreneurs who were employed in more hierarchical firms (4 layers) prior to entry into entrepreneurship and move to less hierarchical firms (2 layers) earn 12% (n.s.) more than their matched counterparts.

**Table 13**  
Results based on Pre-entry Firm Size and Re-entry Firm Size

Pre-Entry Firm Size	Re-Entry Firm Size	
	Less than 50 emp. (1)	More than 500 emp. (2)
Less than 50 emp.	-0.10** (0.03) (N=1,605)	0.04 (0.04) (N=240)
More than 500 emp.	0.18* (0.08) (N=103)	0.06 (0.07) (N=143)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income, Firm Age (categories), Layers (categories), Rank, Industry (categories), Occupations (categories) Year, Previous income, duration in entrepreneurship, number of spells in entrepreneurship, operating profit. Standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

**Table 14**

Results based on Pre-entry Employer Age and Re-entry Employer Age

Pre-Entry Firm Age	Re-Entry Firm Age	
	Less than 3 years (1)	More than 10 years (2)
Less than 3 years	0.01 (0.05) (N=87)	0.14*** (0.03) (N=288)
More than 10 years	0.19* (0.08) (N=15)	0.01 (0.04) (N=229)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income, Firm Size (categories), Layers (categories), Rank, Industry (categories), Occupations (categories), Year, Previous income, duration in entrepreneurship, number of spells in entrepreneurship, operating profit. Standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

**Table 15**

Results based on Pre-entry Layers and Re-entry Layers

Pre-Entry Firm Layers	Re-Entry Firm Layers	
	Layers (2) (1)	Layers (4) (2)
Layers (2)	0.00 (0.03) (N=260)	0.01 (0.03) (N=198)
Layers (4)	0.12 (0.06) (N=69)	0.10*** (0.03) (N=417)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income, Firm Age (categories), Firm Size (categories), Rank, Industry (categories), Occupations (categories), Year, Previous income, duration in entrepreneurship, number of spells in entrepreneurship, operating profit. Standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

Overall, the results suggest that smaller, younger and less hierarchical firms are more likely to value the skills and knowledge of ex-entrepreneurs, however the returns are likely to be contingent on the pre-entry employer characteristics of the ex-entrepreneur. This indicates that the returns from entrepreneurship for entrepreneurs re-entering wage employment after entrepreneurship are dependent on the characteristics of the employer prior to entrepreneurial entry as well as the employer characteristics upon re-entry.

## Organizational Rank and Returns from entrepreneurship

Hypothesis (2a) predicts that entrepreneurs who were managers beforehand, are likely to have higher wages than matched employees upon re-entry, while entrepreneurs who were non-managers beforehand are likely to have lower wages relative to matched employees upon re-entry. Table 16 presents the ATT estimation results for the various treatment groups based on the rank of the entrepreneur and

the control group of matched employees using OLS regression with the weights of the EB algorithm.

**Table 16**  
Results Hypothesis 2a (Organizational Rank on Re-entry)

Treatment Groups	Control Group of Matched Employees in Paid Employment (N=240,332)	
	ATT	ATT with controls
	(1)	(2)
T1 Re-entry Non-Managers (N=2,134)	-0.07*** (0.01)	0.11 (0.07)
T2 Re-entry Managers (N=517)	0.18*** (0.03)	0.31* (0.13)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income, Firm Age (categories), Firm Size (categories), Layers (categories), Industry (categories), Occupations (categories), Year, Previous income, duration in entrepreneurship, number of spells in entrepreneurship, operating profit, industry switch. Standard errors are in parenthesis. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

The first row in column 1 contains the estimated effect of the treatment of moving as a non-manager after an experience in entrepreneurship. It shows that moving as non-manager, an ex-entrepreneur faces a 7% reduction in wages post entrepreneurship compared to matched employees. However, moving as managers, ex-entrepreneurs earn 18% more than matched employees. The results suggest that employers are likely to value the generic skills of entrepreneurs from their entrepreneurial experience and ex-entrepreneurs are likely to find a better match in managerial positions. However, entrepreneurs moving as non-managers are unlikely to find a match to their skills from an entrepreneurial experience in subsequent employment hence lowering their wages relative to employees with no entrepreneurial experience. The results provide support for hypothesis 2a.

Hypothesis (2b) predicts that entrepreneurs who were managers prior to entry into entrepreneurship are likely to have higher wages than matched employees, while entrepreneurs who were non-managers prior to entry into entrepreneurship are likely to have lower wages relative to matched employees. Table 17 presents the results of hypothesis 3b. The table presents the ATT estimation results for the various treatment groups based on the prior rank of the entrepreneur and the control group of matched employees using OLS regression with the weights of the EB algorithm.

**Table 17**

Results Hypothesis 2b (Organizational Rank on Pre-entry)

Treatment Groups	Control Group of Matched Employees in Paid Employment (N=240,332)	
	ATT	ATT with controls
	(1)	(2)
T1 Pre-entry Non-Managers (N=2,115)	-0.04*** (0.01)	0.13 (0.07)
T2 Pre-entry Managers (N=536)	0.10** (0.03)	0.22 (0.13)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income, Firm Age (categories), Firm Size (categories) Industry (categories), Occupations (categories), Year, Previous income, duration in entrepreneurship, number of spells in entrepreneurship, operating profit. Standard errors are in parenthesis. \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

The first row in column 1 contains the estimated effect of the treatment of being employed as a non-manager prior to entry into entrepreneurship. It shows that post entrepreneurship, such entrepreneurs have a 4% reduction in wages compared to matched employees. However, being employed as a manager prior to entry, such entrepreneurs earn 10% more than the matched employees. The results suggest that being employed as a manager prior to entry into entrepreneurship, managers appreciate their generic skills from their entrepreneurial experience, making it more likely that these skills find value in subsequent employment post entrepreneurship, providing them higher wages relative to matched employees. However, being employed as a non-manager prior to entry into entrepreneurship means non-managers are unlikely to find a match in entrepreneurship thereby possibly depreciating their prior skills and knowledge. Such knowledge and skills are unlikely to be valued in subsequent wage employment, leading to lower wages. The results support hypothesis 2b.

### Additional Analysis for Pre-Entry Rank and Re-Entry Rank

As a further investigation, I create treatment groups that combine the rank prior to entry and the rank upon re-entry. Table 18 presents the ATT of each of the combinations. I observe that entrepreneurs employed as managers prior to entry and employed as managers upon re-entry earn 28% more than their matched employees. The results indicate that managers appreciate their skills from prior employment and from entrepreneurship and find better matches as managers, leading to higher wages relative to those employees who do not experience any entrepreneurship.

**Table 18**

Results based on Pre-entry Rank and Re-entry Rank

Pre-Entry Organizational Rank	Re-Entry Organizational Rank	
	Non-managers	Managers
Non-managers	0.02* (0.01) (N=1,934)	0.22*** (0.03) (N=181)
Managers	0.01 (0.04) (N=200)	0.28*** (0.04) (N=336)

The controls include Age, Gender, Marital Status, #children, Children under six, Sector, STEM, PhD. (yes/no), Stockholm commune, Capital Income, Firm Age (categories), Firm Size (categories), Firm Layers (categories), Industry (categories), Occupations (categories), Year, Previous income, duration in entrepreneurship, number of spells in entrepreneurship, operating profit. Standard errors are in parenthesis. \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

## Discussion & Implications

A central subject in entrepreneurship research is not only understanding the causes for entrepreneurship but also its consequences – examined here as the returns from entrepreneurship for entrepreneurs returning to wage employment following an experience in entrepreneurship. Motivated largely by the public policies towards promoting entrepreneurship and the spurt in participation in self-employment by the labor force, extant research investigates returns not only during entrepreneurship (e.g. Hamilton, 2000) but also returns following an entrepreneurial experience (e.g. Kaiser & Malchow-Møller, 2011; Luzzi & Sasson, 2016). A significant number of entrepreneurs move into wage employment following entrepreneurship. This study contributes to this understanding in several ways.

First, prior studies largely use human capital theory as the theoretical foundation to examine returns from entrepreneurship (e.g. Bruce & Schuetze, 2004; Kaiser & Malchow-Møller, 2011; Luzzi & Sasson, 2016). This study advances our understanding of how the division of labor (Weber, 1922) in organizations is likely to confound the human capital of ex-entrepreneurs, which in turn is likely to influence wages of ex-entrepreneurs. The results indicate that the division of labor in large bureaucratic firms (e.g. 500+ employees) enhances skills sorting with the expectations that employees should have specialized rather than generic skills, thereby providing lower wages (although positive relative to matched employees) than firms of average size where skill sorting is more modest (e.g. 50-500 employees).

Second, bureaucracies are an important part of the labor market and are attractive employers. They offer stable careers and higher wages relative to smaller, less bureaucratic firms (Kalleberg & Van Buren, 1996). This study advances our understanding of how bureaucracies are likely to reward entrepreneurs who re-enter



paid employment following a career in entrepreneurship. Earlier studies of the role of pre-founding employment in bureaucracies (e.g. Sørensen, 2007; Tåg et al., 2016) focused exclusively on entrepreneurial entry, ignoring the potential subsequent effects of post-founding and pre-founding employment in bureaucracies. The results suggest that ex-entrepreneurs entering larger firms (500+ employees) earn 6% more than matched employees, while entrepreneurs entering very small firms (less than 10 employees) earn 6% less than their matched counterparts in wage employment. In another paper studying Norwegian entrepreneurs from 2006 to 2012, Luzzi and Sasson (2016) found that on average, entrepreneurs earned 19% more than similar employees switching workplaces. This study elevates our prior understanding of post-entrepreneurship returns to wage employment by suggesting that we need to look beyond average returns and seek to provide a more refined explanation based on the bureaucratic characteristics of the employer – not only prior to entrepreneurial entry but also upon re-entry into wage employment. Employing firms differ in their skills requirement and are hence likely to value entrepreneurial skills differently. Overall, the results indicate the firms differ on the basis of the bureaucratic characteristic by which they reward ex-entrepreneurs. For example, entrepreneurs employed in less bureaucratic firms (e.g. those with less than 10 employees or firms with two layers) have lower wages but entrepreneurs employed in more bureaucratic firms (e.g. firms with 500+ employees or firms with 4 layers) have higher wages relative to matched employees. Further investigation (Table 9), revealed that ex-entrepreneurs who were employed in more bureaucratic firms (e.g. firms with 500+ employees) prior to entry into entrepreneurship and who re-entered less bureaucratic firms (e.g. firms with less than 50 employees) earn 18% more than their matched counterparts. This indicates that entrepreneurs are likely to get rewarded for their skills not only based on the bureaucratic characteristic of their re-entering employer but also on the bureaucratic characteristic of their pre-founding employer. Essentially, the results indicate that it is the combination of an entrepreneurs' pre-founding and post-founding employer affiliation that influences their wages upon re-entry into paid employment.

And third, STLF finds significant interest among entrepreneurship scholarship. Studies largely focus on the entrepreneurial entry (e.g. Braguinsky et al., 2012; Stenard & Sauermann, 2016) of this highly skilled workforce, however, entrepreneurship is not an end in itself and is part of a dynamic career (Burton, Sørensen, & Dobrev, 2016). This study contributes to the literature by examining the post-entrepreneurship careers of a high skilled workforce who re-enter paid employment after entrepreneurship. Our results indicate that post entrepreneurship, a high skilled workforce is likely to have returns to their skills and knowledge from entrepreneurship contingent on the match of their skills in the re-entering employer and the skills learned from their employer prior to entrepreneurial entry. For example, upon re-entering paid employment, entrepreneurs who are employed as managers are likely to see their wages increase by 18% relative to those who do not experience entrepreneurship, however those who were employed as non-managers

prior to entry into entrepreneurship are likely to see their wages decrease by 4% relative to matched counterparts in wage employment.

## Limitations and future research

This study has limitations, which provide avenues for future research. In the beginning of the study, I emphasized the challenge of individual heterogeneity that such studies face. I aimed to overcome this challenge partly by restricting the sample to STLFE employees with a new job. This was necessary to reduce unobserved heterogeneity, and yielded different results than what could be expected from studying the whole populations of employed, unemployed, and part-time employed people in Sweden. This is likely to influence the results on returns from entrepreneurship. Additionally, the labor market of Sweden (CME) is different from that of the US (LME) (Soskice & Hall, 2001). The results of this study indicate that large firms in Sweden, being dominant employers and having different expectations of their employees, are likely to penalize ex-entrepreneurs. Future research could test the argument that larger firms are likely to pay higher wages by investigating a liberal market such as the US and whether this is applicable to ex-entrepreneurs.

And second, the literature on entrepreneurial exit (Wennberg, 2011; Wennberg & DeTienne, 2014) suggests different exit routes for entrepreneurs. The literature suggests that the exit strategy taken by the entrepreneurs is likely to have implications on the future wages of entrepreneurs. Future research can investigate how different exit routes have implications on wages depending on the size of the exit firm and the size of the employer. It may be that the smallest firms (less than 10 employees) are likely to “welcome” very successful entrepreneurs from their prior venture and may therefore provide them with non-monetary benefits such as stock options, thereby providing (indirect) higher wages to ex-entrepreneurs compared to the employees.

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# Entrepreneurship as a Career

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My research lies at the intersection of organizations and entrepreneurship. Specifically, my research examines the impact of organizational contexts such as bureaucracy and wage inequality on an employee's propensity to venture into entrepreneurship, examining the careers of knowledge workers from the science and technology labor force (STLF). Additionally, my research examines entrepreneurial outcomes, namely, the returns from entrepreneurship during and on re-entry into paid employment. I examine my research through the sociology of entrepreneurship.

Methodologically, my research uses quantitative methods drawing on Swedish labor market data provided by Statistics Sweden (SCB). My long term goal is to apply computational social science methods such as Simulation (e.g. Agent Based Modeling (ABM)), Natural Language Processing (NLP) and Big Data into entrepreneurship research.