Entrepreneurial Careers

Determinants, Trajectories, and Outcomes

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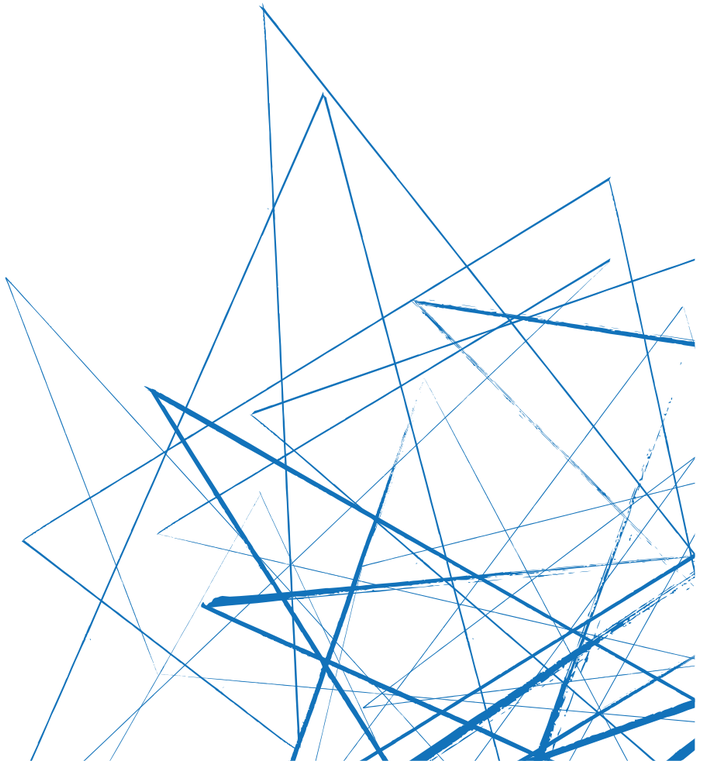

Adrián Luis Mérida Gutiérrez

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PhD School in Economics and Management

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HANDELSHØJSKOLEN

Entrepreneurial Careers: Determinants, Trajectories, and Outcomes

Adrián Luis Mérida Gutiérrez

Supervisors:

Prof. Mirjam Van Praag

Prof. Hans Christian Kongsted

Ph.D. School in Economics and Management

Copenhagen Business School

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The PhD School in Economics and Management is an active national and international research environment at CBS for research degree students who deal with economics and management at business, industry and country level in a theoretical and empirical manner.

Acknowledgments

Embrace the days, don't turn away, life's true intent needs patience

— Dream Theater, Breaking All Illusions

And so this journey comes to an end. When I first came to Copenhagen I was a boy full of hopes, but also insecurities. After almost five years at CBS learning from talented people, growing in an inspirational environment and overcoming numerous challenges, I leave this wonderful city as a man, still full of hopes and insecurities, but a man nonetheless. There are many people to whom I owe my gratitude.

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English Summary

How do the careers of entrepreneurs differ from the rest? Which pathways lead to and result from entrepreneurship? Is entrepreneurial experience valued in the labor market? Despite the increasing attention that the topic of entrepreneurship has captured from scholars across different fields, these and many other questions still remain unsolved. As challenging as it might be, finding answers for such questions is paramount not only to strengthen the current knowledge in the academic literature, but also in light of the increasing interest from policy makers in encouraging entrepreneurial activities. Based on rich observational data from the registers of Denmark and using advanced econometric techniques, this thesis intends to contribute to the extant knowledge on the determinants and outcomes of an entrepreneurial experience by means of three different essays.

The first study investigates the role of student employment in the decision of university students to start up a company upon graduation. Policy makers have often tried to implement entrepreneurship education programs, but practical experiences might be an effective complement in encouraging students to engage in entrepreneurship. Student employment is an increasingly common phenomenon whose implications for academic performance and success in wage employment have been widely investigated. However, little is known in relation to its potential effects on subsequent entrepreneurial intentions. While estimates from naive regressions point to a negative effect, it turns positive when correcting for endogeneity. Moreover, the positive impact is stronger among those who worked in small firms and those with a diverse history of student employment. This study has relevant implications for policy makers looking to increase the currently low entrepreneurship rates among young graduates.

The second essay examines how the careers of the population of Danish graduates vary depending on whether and when they become entrepreneurs. There are considerable trade-offs in the choice of becoming an entrepreneur earlier or later in one's career. However, both entrepreneur-

ship theory and empirical evidence have relatively overlooked the antecedents and consequences of the timing of entrepreneurial experience. This study adds a new layer to the long-lasting debate on the returns to entrepreneurial experience by analyzing when individuals enter entrepreneurship over their careers, and how that matters for both earnings dynamics and new venture outcomes. Results suggest that entrepreneurship can be efficiently used as an experimentation stage for individuals to learn about their occupational fit and the quality of their ideas, and to accumulate human capital. Entry timing might yet shape the scope of experimentation and learning. Thus, this work contributes to the extant knowledge on the returns to entrepreneurial experience and, more broadly, to the debate of whether and to what extent entrepreneurship should be promoted in universities.

Finally, the last chapter assesses how past entrepreneurial experience can affect the pay of top managers. Executive compensation is determined in a competitive market where small differences in skills lead to large variations in the compensation levels. While past research has predominantly focused on the distinction between general and specific managerial skills, little is known as to whether and how a history of entrepreneurial experience influences CEO compensation. Basic descriptive statistics show that former entrepreneurs tend to become top managers in smaller and younger firms, yet they still receive higher compensations, on average. After accounting for the impact of observed and unobserved heterogeneity, results suggest that there is indeed a premium for entrepreneurial experience in the market for top executives, although it is only present when the entrepreneurial spell happened recently, in a related industry, and was successful. These findings reflect that hiring firms are willing to offer an excess pay if the right criteria are met.

Danks Sammendrag

Hvordan er entreprenørers karrierer anderledes fra andres? Hvilke veje fører til entreprenørskab og hvad medfører entreprenørskab? Er erfaring med entreprenørskab værdsat af arbejdsmarkedet? På trods af den stigende opmærksomhed, som emnet entreprenørskab har fået på tværs af forskellige områder, er disse samt mange andre spørgsmål stadig ubesvaret. Hvor udfordrende det end må være, så er det altafgørende at finde svar på disse spørgsmål. Ikke kun for at styrke vores nuværende viden i den akademiske litteratur, men også i lyset af den øgede interesse fra politiske beslutningstagere, som ønsker at fremme entreprenante aktiviteter. Baseret på omfattende observationsdata fra de danske registre og ved brug af avancerede økonometriske teknikker, er det intentionen med denne afhandling at bidrage til viden om determinanterne og resultaterne af entreprenørskab gennem tre essays.

Det første studie undersøger hvilken rolle studiejob spiller i universitetsstuderenes beslutning om at starte en virksomhed efter studiet. Politiske beslutningstagere har ofte forsøgt at implementere undervisningsprogrammer i entreprenørskab, men praktisk erfaring er måske også et effektivt supplement til at motivere studerende til at engagere sig i entreprenørskab. Studiejobs er i stigende grad et almindeligt fænomen hvortil implikationerne for akademisk præstation og succes på arbejdsmarkedet er blevet undersøgt i bred udstrækning. Dog ved vi ikke meget omkring potentielle effekter på efterfølgende entreprenørskab. Imens estimater fra naive regressioner peger i retning af en negativ effekt, så bliver effekten positiv når der kontrolleres for endogenitet. Derudover er den positive effekt større blandt dem som har arbejdet i små virksomheder og dem som har en alsidig historik af studiejobs. Dette studie har relevante implikationer for politiske beslutningstagere, som ønsker at øge den på nuværende tidpunkt lave entreprenørskabsrate blandt unge studerende.

Det andet essay undersøger hvordan karrierer i blandt danske studerende varierer afhængigt af hvornår de bliver entreprenører. Der er væsentlige afvejninger i beslutningen om at blive en-

treprenør og om timingen i løbet af ens karriere. Både entreprenørskabsteori og empirisk evidens relativt overset fortilfældene og konsekvenserne af timingen af entreprenørskabserfaring. Studiet tilføjer et nyt lag til den længevarende debat omkring afkastet fra entreprenørskabserfaring. Dette gøres ved at analysere hvornår i deres karriere individer træder ind i entreprenørskab og hvordan det påvirker både deres indtjening samt udfaldet af deres nye virksomhed. Resultater indikerer at entreprenørskab kan bruges som et eksperimentelt stadie for individer til at lære om deres erhvervsmæssige præference og kompetence, kvaliteten af deres idéer, samt akkumulere menneskelig kapital. Timingen for indtræden i entreprenørskab former muligvis potentialet for eksperimentering og læring. Derfor bidrager dette studie til den eksisterende viden omkring afkast fra entreprenørskabserfaring og i et bredere perspektiv til debatten omkring hvor vidt og i hvilket omfang entreprenørskab skal promoveres på universiteter.

Det sidste kapitel vurderer i hvilket omfang entreprenørskabserfaring kan have en effekt på toplederes løn. Topllederkompensation fastsættes af et konkurrencepræget marked hvor små forskelle i kompetencer leder til store variationer i kompensationsniveauer. Hvor tidligere forskning hovedsageligt har fokuseret på differentieringen mellem generelle og specifikke ledelsesmæssige kompetencer, findes der begrænset viden om hvorvidt og hvordan en baggrund med erfaring indenfor entreprenørskab påvirker topleder kompensation. Basal deskriptiv statistik viser at tidligere entreprenører har tendens til at blive topledere i mindre og yngre virksomheder, alligevel får de gennemsnitligt højere løn. Når der tages højde for observerbar og ikke-observerbar heterogenitet viser resultaterne, at der ganske vist er en bonus ved entreprenørskabserfaring i markedet for topledere. Dog er denne effekt kun til stede når entreprenørerfaringen er nylig, i en relateret industri, samt succesfuld. Disse resultater indikerer at hyrende virksomheder er villige til at tilbyde ekstra løn hvis de rigtige kriterier er mødt.

Resumen en Español

¿En qué se diferencian las carreras de los emprendedores del resto? ¿Qué caminos conducen y resultan del emprendimiento? ¿Se valora la experiencia empresarial en el mercado laboral? A pesar de la creciente atención que el tema del emprendimiento ha captado entre los académicos de diferentes campos, estas y muchas otras preguntas siguen sin resolverse. Por más desafiante que sea, encontrar respuestas para tales preguntas es primordial no solo para fortalecer el conocimiento actual en la literatura académica, sino también a la luz del creciente interés de los gobiernos en fomentar actividades empresariales. Usando detallados datos administrativos de los registros de Dinamarca y utilizando avanzadas técnicas econométricas, esta tesis pretende contribuir al conocimiento existente sobre los determinantes y los resultados de la experiencia empresarial a través de tres ensayos diferentes.

El primer estudio investiga el papel del empleo estudiantil en la decisión de los estudiantes universitarios de crear una empresa después de graduarse. Los gobiernos a menudo han intentado implementar programas de educación para el emprendimiento, pero la experiencia práctica puede ser un complemento efectivo para alentar a los estudiantes a participar en el emprendimiento. El empleo estudiantil es un fenómeno cada vez más común cuyas implicaciones para el rendimiento académico y el éxito en el sector del empleo remunerado se han investigado ampliamente. Sin embargo, poco se sabe con relación a sus posibles efectos sobre las consiguientes intenciones empresariales. Aunque las estimaciones iniciales apuntan a un efecto negativo, éste se vuelve positivo cuando se corrige la endogeneidad. Además, el impacto positivo es más fuerte entre quienes trabajaron en pequeñas empresas y entre aquéllos con una experiencia diversa en el empleo estudiantil. Este estudio tiene implicaciones relevantes para los responsables de las políticas que busquen aumentar tasas de emprendimiento entre los jóvenes graduados, las cuales son particularment bajas en la actualidad.

El segundo ensayo examina cómo varían las carreras de los graduados universitarios daneses

dependiendo de si se convierten en empresarios y de cuándo lo hacen. Hay diversos aspectos a considerar a la hora de decidir qué momento de la carrera profesional es el más adecuado para realizar el paso al emprendimiento. Sin embargo, tanto la teoría del emprendimiento como la evidencia empírica han pasado por alto los antecedentes y las consecuencias de la elección de dicho momento. Este estudio agrega una nueva capa al extendido debate sobre los rendimientos de la experiencia empresarial al analizar cuándo las personas ingresan al emprendimiento a lo largo de sus carreras, y cómo esta decisión afecta tanto a las ganancias individuales de los emprendedores como al rendimiento de sus empresas. Los resultados sugieren que el emprendimiento puede servir como una etapa de experimentación en la que las personas pueden aprender sobre su capacidad empresarial y sobre la calidad de sus ideas, así como acumular experiencia y capital humano. Además, el momento de entrada al emprendimiento puede influir en dicho proceso de experimentación y aprendizaje. Por lo tanto, este trabajo contribuye al conocimiento existente en relación a los retornos de la experiencia empresarial y, más ampliamente, al debate sobre en qué medida se debería promover el espíritu empresarial en las universidades.

Finalmente, el último capítulo evalúa cómo la experiencia empresarial pasada puede afectar el salario de los altos directivos. La compensación de los altos ejecutivos se determina en un mercado competitivo donde pequeñas diferencias en habilidad conducen a grandes variaciones en los niveles de compensación. Si bien las investigaciones anteriores se han centrado principalmente en la distinción entre habilidades gerenciales generales y específicas, poco se sabe acerca de si la habilidad empresarial influye en la compensación de los directivos. Las estadísticas descriptivas muestran que los ejecutivos que fueron empresarios tienden a dirigir empresas más pequeñas y más jóvenes, pero aún así reciben una mayor compensación, en promedio. Después de reducir el impacto de la heterogeneidad observada y la inobservable, los resultados sugieren que, de hecho, existe una prima para la experiencia empresarial en el mercado de los altos ejecutivos, aunque dicha prima sólo está presente cuando la experiencia empresarial es reciente, ocurrió en una industria relacionada, y fue exitosa. Estos hallazgos reflejan que las empresas contratantes están dispuestas a ofrecer un pago excesivo a los ex-emprendedores si se dan las circunstancias apropiadas.

Contents

Chapter 1

Introduction

Motivation and Context

Entrepreneurship is perceived as a driver of societal benefits and economic growth, through its potential to positively affect innovation, job and wealth creation, and productivity, among other outcomes (Malchow-Møller et al. 2011; van Praag and Versloot 2007; Wennekers and Thurik 1999). Indeed, the economic literature generally finds that entrepreneurship is positively related to economic development (e.g. Audretsch and Keilbach 2004; Parker 2018), albeit the relationship comes largely from growth-oriented businesses (Blanchflower 2004; Shane 2009; van Praag and van Stel 2013). Consequently, governments around the world often resort in promotion policies to encourage the creation of more start-ups, for example by subsidizing entrepreneurship training (Fairlie et al. 2015) or by implementing entrepreneurship education programs at schools and universities (Martin et al. 2013; Oosterbeek et al. 2010). In doing so, policy makers should ideally be aware of the main pathways leading to and resulting from entrepreneurship. When determinants of entrepreneurship are clearly identified, the task of promoting it among (a particular section of) the population can be done more effectively. Likewise, understanding the potential outcomes of an entrepreneurial experience should help avoid undesired effects on the individuals themselves.

The literature on entrepreneurship has been increasing steadily over the last years, and plenty of determinants and outcomes of an entrepreneurial spell have been explored. For instance, it has been shown that entrepreneurship is a more common option for individuals who are overoptimistic (Dushnitsky 2010; Lowe and Ziedonis 2006), overconfident (Hayward et al. 2006) or more tolerant to risk and uncertainty (Holm et al. 2013; Hvide and Panos 2014; Koudstaal et al. 2015). Sim-

ilarly, those who worked in small businesses are more likely to become entrepreneurs (Elfenbein et al. 2010; Gompers et al. 2005; Sørensen and Fassiotto 2011), as are those whose workplace peers have entrepreneurial experience (Nanda and Sørensen 2010), those who lived in entrepreneurial neighborhoods (Giannetti and Simonov 2009), and those with entrepreneurial parents (Lindquist et al. 2015). Moreover, an entrepreneurial experience may have different outcomes related to aspects as diverse as the individuals' current earnings (Hamilton 2000), future wages (Kaiser and Malchow-Møller 2011), labor mobility (Failla et al. 2017), human capital development (Lazear 2004, 2005), and job satisfaction (Benz and Frey 2008a, 2008b), among others. Unfortunately, in many occasions results have been mixed or contradictory, sometimes due to differences in methodological approaches. Besides, some potential determinants and outcomes remain unexplored and the current understanding of how the careers of entrepreneurs differ from the rest is limited, as that stream of literature has only arisen very recently (Burton et al. 2016; Kerr et al. 2014). In this context, the aim of this thesis is to contribute to the extant literature by providing new insights related to different aspects and particularities of entrepreneurial careers.

Intended Contributions

Understanding how entrepreneurial careers differ from the rest in terms of both determinants and outcomes is particularly relevant in light of the increasing interest of governments around the globe in developing policies to promote entrepreneurship. In the recent years, an emphasis has been placed on encouraging the creation of start-ups among students through the implementation of entrepreneurship education programs and business incubators at many universities (Martin et al. 2013). In the case of Denmark, the Ministry of Higher Education and Science is carrying out efforts to implement better and more entrepreneurship education programs at the primary, secondary, and higher education levels. Specific measures include the incorporation of subjects and courses focused on entrepreneurship, the execution of activities and initiatives to foster an entrepreneurial attitude among students, as well as the establishment of incubators to offer support for those students interested in putting their business ideas into practice.

Although this strategy—which is akin to those utilized in other countries—may be a step in the correct direction in the quest to generate more graduate entrepreneurs, it may be the case that more practical experiences would enhance its effectiveness. This dissertation proposes that

student employment can be an interesting complement to the current measures, as it provides young students with practical contact with the real business world. Working while studying has become increasingly common among the more recent generations (Orr et al. 2011; Scott-Clayton 2012), and it allows them to learn not only about the real industry, but also about their own preferences with regard to working for someone else in comparison with what self-employment might bring them. To date, no other study has considered the role of student employment on subsequent venture creation, despite its potentially relevant implications. Hence, this thesis delves deep into this question in order to contribute to the current knowledge of the potential drivers of entrepreneurial behavior among young students.

In any case, whether encouraging students to become entrepreneurs is as desirable as popular culture tends to believe is questionable. Finding economic success in entrepreneurship is rare, as this occupation is characterized by the presence of many low earning self-employed workers and a very small number of high-achieving entrepreneurs à la Steve Jobs or Mark Zuckerberg (Åstebro et al. 2011). Moreover, failed entrepreneurial experiences might be penalized in subsequent wage employment (Bruce and Schuetze 2004; Williams 2000). Although entering entrepreneurship early in life offers the possibility of enjoying the potential benefits for a longer period of time, it may also be the case that promising business ideas are not implemented at their full potential by such young graduates due to their generalized lack of experience and resources.

Perhaps the focus should not be on encouraging students to become entrepreneurs, but on providing them with the appropriate set of skills and knowledge that they will need in case they decide to create their own firms later in their lives. It is therefore paramount to study the concept of the *timing* of entrepreneurship within a professional career in order to understand whether and how the decision to enter earlier than later—or not entering at all—leads to different career trajectories and labor market outcomes. This thesis contributes to reduce such a gap in the literature by comparing the careers of graduates who choose entrepreneurship as their initial occupation upon entering the labor market to those of graduates who become entrepreneurs later in their careers, and those who never engage in entrepreneurship. A lifecycle approach is taken in order to account for the option value of experimenting in entrepreneurship, which can only be captured by examining a sufficiently long share of an individuals' career (Manso 2016).

Speaking of outcomes related to an entrepreneurial experience, the literature provides evidence that employees returning to the paid sector after a spell in entrepreneurship tend to be more likely

to reach managerial positions (Baptista et al. 2012). Yet, whether managers with entrepreneurial experience receive a higher compensation than others remains unexplored at the time of writing. Executive compensation is determined in a competitive market, and small differences in ability lead to large variations in the compensation levels (Gabaix and Landier 2008; Tervio 2008). While past research has predominantly focused on the distinction between general and specific managerial skills (Custódio et al. 2013; Murphy and Zábojník 2004), little is known as to whether and how a history of entrepreneurial experience influences CEO compensation. This dissertation provides an answer for this question, thereby adding to the literature in the fields of entrepreneurship and finance.

Thus, the dissertation is centered around the concept of entrepreneurial experience and the studies included complement each other to provide a bigger picture of the circumstances that encourage (young) individuals to engage in entrepreneurship, and how such an entrepreneurial experience—even early in life—is associated with different career trajectories and may affect wages in subsequent paid jobs, even at the top of the ladder.

Data and External Validity

Throughout this thesis, state-of-the-art econometric analyses are performed based on administrative data from the registers of Denmark: the Danish Integrated Database for Labor Market Research, often referred to as "IDA" (*Integreret Database of Arbejdsmarkedsforskning*). The Danish government gathers and maintains an unusually extensive amount of detailed information pertaining to individuals and firms existing in Denmark on a yearly basis since 1980.[1]

This unique database offers several important features that enable high-quality statistic and econometric analyses. First, it contains rich information on a variety of individual characteristics such as age, gender, marital status, number of children, geographical location, education details, work experience, labor market trajectories, earnings, or wealth. Second, IDA is a longitudinal database that covers a period of over 30 years, hence enabling the possibility to perform reliable panel data analyses capturing different states of the economic cycle as well as tracking employer changes and other labor market dynamics annually. Last, the structure of IDA allows matching individuals to firms, and also enables the identification of family ties. These last features are rarely found in the majority of the available datasets, and are highly appreciated in the field

[1] Further details on the IDA database are provided by Timmermans (2010) .

of entrepreneurship because (i) individual attributes of the founders have strong relationships with firm-level characteristics such as performance, survival, and size (Colombo and Grilli 2005; Dencker et al. 2008), and (ii) entrepreneurial behavior can be transmitted from parents to children (Lindquist et al. 2015; Sørensen 2007b).

A potential concern might arise with regard to the external validity of the analyses presented in this thesis, given the "flexicurity" that characterizes the Danish economy. On the one hand, the welfare state entails high income and profit taxes, which might discourage individuals to pursue their own ventures to a certain extent. On the other hand, its extensive social security system could act as a safety net for potentially failed entrepreneurs, hence minimizing the risky elements of starting up a company. Moreover, Denmark offers a prosperous environment for the development of entrepreneurial activities. In 2018, Denmark ranked 6^{th} in the Global Entrepreneurship Index (Acs et al. 2018) and 12^{th} in the Index of Economic Freedom (Miller et al. 2018), not far from widely studied countries such as United Kingdom (4^{th} and 8^{th}, respectively) and the United States (1^{st} and 18^{th}). Importantly, Denmark ranks 1^{st} in terms of overall levels of entrepreneurial ability and is among the top countries as regards to the share of opportunity start-ups (Acs et al. 2018). Thus, despite the particularities of the Danish welfare system, its economic environment enables the establishment of strong entrepreneurial ecosystems, and the flexibility of its labor market leads to levels of dynamism of mobility similar to those in the U.K. or the U.S. (Jolivet et al. 2006).

Hence, it can be concluded that, to a large extent, the results presented in this thesis might be extrapolated to other occidental countries, which share similarities in the way their labor market functions. Nonetheless, replications of the analyses performed throughout this thesis in countries with alternative economic systems and cultures are encouraged and could bring interesting new perspectives and conclusions.

Dissertation Structure

This dissertation comprises three studies in which different research questions are explored. Although such questions are tackled from an empirical perspective, theoretical concepts such as human capital acquisition, signaling, experimentation, and learning are used across the different chapters in order to develop expectations and to identify potential mechanisms to be tested in post-hoc analyses.

Chapter 2 is a joint work with Raquel Justo, from University of Huelva, in which we analyze the role of student employment in the decision of university students to start up a company upon graduation. Chapter 3 is a study coauthored with Vera Rocha, from Copenhagen Business School, where we consider the role of the timing of entry into entrepreneurship within a professional career, and explore to what extent individuals who become entrepreneurs early in their careers differ in terms of lifetime earnings and labor market dynamics from those who become entrepreneurs later in their lives and those who never engage in entrepreneurship. Lastly, chapter 4 investigates whether formerly entrepreneur top managers earn a different compensation than top managers without experience in entrepreneurship.

Chapter 2: Student Employment and Entrepreneurship

Student employment has become increasingly common in most western countries during the last few decades (Orr et al. 2011). In the U.S., for example, about one in five students in higher education programs combine work and study, and only one in four devote their entire time to their academic life (Scott-Clayton 2012). The emergence of this phenomenon has not passed under the radar of scholars from different fields. As such, the effects of working while studying on subsequent academic performance (e.g. Ehrenberg and Sherman 1987; Stinebrickner and Stinebrickner 2003) and success in the wage-employment sector (e.g. Häkkinen 2006; Light 2001) are well documented in the literature. However, whether it may also have an impact on the entrepreneurial behavior of young graduates is a question that remains unanswered. This study provides the first set of empirical evidence on this matter.

There are arguments supportive of both a positive and a negative effect of student employment on entrepreneurial entry. Working while studying may act as a differentiation signal for potential employers (Baert et al. 2016; Weiss et al. 2014), and allows students to acquire and develop relevant skills and human capital (Humburg and Van der Velden 2015; Passaretta and Triventi 2015). Hence, students who worked before graduating should be expected to face a greater opportunity cost when deciding whether to start up a business, as their employability in the paid sector is higher, thereby being less likely to become entrepreneurs. Conversely, active participation in the labor market enables the recognition of business opportunities (Singh et al. 1999; Ucbasaran et al. 2008), particularly in small firms (Dobrev and Barnett 2005; Gompers et al. 2005; Sørensen 2007a). In addition, a diverse academic or professional background is positively associated with

entrepreneurial behavior (Lazear 2004, 2005). Thus, it is also possible that student employment leads to a higher likelihood of engaging in entrepreneurship, depending on the size of the firms where they worked as well as on how diverse their experiences are.

Because of the competing arguments, we deal with this question from an empirical perspective by identifying the population of Danish university students and examining the effects of working while studying on their post-graduation entrepreneurial behavior. After a thorough data cleansing procedure, our final sample includes a total of 204,403 students, out of which 3,011 (1.50%) engage in entrepreneurship at some point during the first three years after finishing their studies. The small share of students becoming entrepreneurs upon graduation is in line with figures in other occidental countries (Åstebro et al. 2012; Bergmann et al. 2016; Larsson et al. 2017), which explains why governments are allocating resources to foster entrepreneurship at universities. Moreover, student employment appears to be rather common among Danish students, as almost 88% of them have had some working experience while enrolled at university, although the majority of them tend to work only occasionally.

The relationship between student employment and entrepreneurial entry is likely endogenous, as the decision to become an entrepreneur is likely motivated by certain unobserved traits, such as overoptimism or ability, that could also explain selection into student employment. In cases like this, where estimates from conventional OLS estimations may not be trusted, instrumental variable regressions are a solid alternative (Wooldridge 2010). We utilize three different instruments: (i) average regional unemployment rates during the enrollment period, (ii) the share of the total enrollment period that students lived with their parents, and (iii) a policy change that took place in Denmark in 1996 whereby the maximum amount that students were allowed to earn from labor market activities while still being eligible for a study grant was raised by 32.5%, thus incentivizing them to work more intensively than before.

While estimates from preliminary OLS regressions pointed to a negative relationship, the effect is reversed when using the instrumental variables to correct for endogeneity. Moreover, the positive impact is stronger among those who worked in small firms and those with a diverse history of student employment in terms of number of firms and number of industries. The fact that the effect of student employment on entrepreneurial behavior turns positive after minimizing the effect of unobserved factors may indicate that students who decide to work while studying are less likely than the others to show a preference for entrepreneurship, as a baseline. However, after some time

in contact with the labor market they seem to develop entrepreneurial intentions, potentially due to the acquisition of diverse skills, the ability to learn from their employers, and the identification of business opportunities. Hence, the new insights provided by this study could open alternative venues for policy makers interested in boosting the rates of graduate entrepreneurs.

Chapter 3: It's About Time: Timing of Entrepreneurial Experience and Career Dynamics of University Graduates

The third chapter connects with the second one and explores to what extent having an entrepreneurial experience early in life may lead to different career trajectories. Entrepreneurship has typically been treated as an end-state in transitions from wage employment or unemployment, but recent studies propose taking a career perspective and treating entrepreneurship as a step along a career path which allows individuals to experiment and learn from an entrepreneurial experience (Burton et al. 2016; Kerr et al. 2014). Interestingly, this alternative approach opens new avenues for research and challenges some of the stylized facts in the previous literature, such as the supposedly lower earnings of the self-employed workers (Hamilton 2000) and the potential penalty that they receive upon returning to the wage sector (e.g. Bruce and Schuetze 2004; Hyytinen and Rouvinen 2008). Indeed, recent contributions using longitudinal data and a lifecycle approach claim to better capture the value of experimenting in entrepreneurship and tend to find that individuals with entrepreneurial experience enjoy higher lifetime earnings (Daly 2015; Manso 2016).

Yet, little is known about the role of the timing within one's career of such entrepreneurial experience. There is a trade-off involved in the choice of entering entrepreneurship at the beginning of one's career instead of later in life (Dillon and Stanton 2017; Vereshchagina and Hopenhayn 2009). A young graduate may consider entering entrepreneurship early in order to have a longer time horizon to reap the profits of her business, but may also decide to postpone the venture instead, in order to gain experience that may be useful to improve her performance as an entrepreneur in the future. In either case, this decision is likely to lead to different career paths, as early experiences tend to have long-lasting effects (Altonji et al. 2015; Cockx and Ghirelli 2016; Kahn 2010; Oreopoulos et al. 2012). Therefore, it is both interesting and relevant to explore how the timing of entrepreneurship moderates the relationship between entrepreneurial experience and lifetime earnings, and whether different career pathways arise as a consequence.

Empirically, we employ matching techniques to compare lifetime earnings and other indicators of labor market performance of graduates who enter the labor market through entrepreneurship ("early entrepreneurs"), graduates who become entrepreneurs later in their careers ("late entrepreneurs"), and graduates who never do it ("never entrepreneurs"). Our results suggest that, compared to never entrepreneurs, early entrepreneurs face a short-term earnings penalty that dissipates over time, are more likely to change jobs and industries, and have higher chances of reaching managerial positions. However, the group of graduates who become entrepreneurs later in their careers is better-off compared to the other two alternatives. Late entrepreneurs outperform early entrepreneurs as business owners, creating larger start-ups which survive longer, generate more profits, and are more likely to grow over time.

Interestingly, our results suggest that experimentation in entrepreneurship is different depending on the timing. Early entrepreneurs seem to experiment and learn about their fir to an entrepreneurial occupation whereas late entrepreneurs seem to be testing a particular idea rather than their preference for entrepreneurship, as evidenced by their stronger commitment to their ventures and their higher likelihood of becoming serial entrepreneurs. Thus, this work contributes to the extant knowledge of the returns to entrepreneurial experience, as well as the impact of past experience on firm performance. More broadly, this study also adds to the debate of whether and to what extent entrepreneurship should be promoted in universities.

Chapter 4: Entrepreneurial Experience and Executive Pay

Executive pay is determined by the interaction of firms and managers in the frame of a competitive market where small differences in abilities explain a large share of the variation in the compensation levels (Gabaix and Landier 2008; Tervio 2008). However, there seems to be a relationship between the accelerated growth of the overall level of CEO pay and the increasing need that modern firms appear to have for a generalist manager (Murphy and Zábojník 2004). In an increasingly complex environment, general managerial abilities and a broad knowledge of the industry and the market are in high demand, thus making the competition for a certain type of manager fiercer. Consequently, the evidence suggests that generalist CEOs earn a higher compensation than their counterparts (Custódio et al. 2013). Importantly, this and other pieces of evidence from past studies demonstrate that prior career experiences of top managers play a relevant part in explaining their subsequent compensation.

The last chapter of this dissertation assesses to what extent past entrepreneurial experience can affect the compensation of top managers. Entrepreneurship constitutes a unique experience that differs from other occupations on the wage employment sector (Benz and Frey 2008a, 2008b; Hamilton 2000). It has been documented that, on average, a period of time in entrepreneurship past entrepreneurial experience positively affects the likelihood of reaching managerial positions in later stages of life (Baptista et al. 2012). Still, whether a history of entrepreneurial experience can also influence the quantity of the compensation that managers earn has not been examined yet.

In a sample of over 22,000 top managers and more than 18,000 firms operating in Denmark from 1991 onwards, I perform a series of econometric analyses to estimate the impact of past entrepreneurial experience on current executive compensation. Preliminary checks on the data reveal that non-entrepreneurs tend to be better educated and become managers in larger firms, yet they earn a lower pay than managers with experience as business owners, on average. Although the fact that former entrepreneurs sort into smaller companies is consistent with previous studies showing that entrepreneurs have a preference for smaller and younger firms (Elfenbein et al. 2010; Sørensen and Fassiotto 2011), the fact that they tend to earn a higher pay is surprising given that executive compensation is largely dependent on firm size (Gabaix et al. 2014). While former entrepreneurs tend to work longer hours and have more experience, I find that the premium still remains significant after accounting for such differences.

Further concerns regarding unobserved heterogeneity and omitted variables are addressed by means of individual and firm fixed effects estimations, and complemented with instrumental variable regressions. The instrument used in this analysis is whether the parents of the manager were entrepreneurs in the past, under the assumption that entrepreneurial behavior can be transmitted between generations (Lindquist et al. 2015; Sørensen 2007b) but having entrepreneurial parents does not directly affect current executive compensation. Again, results confirm that the effect of past entrepreneurial experience on managerial compensation is positive and significant. However, additional analyses reveal several sources of heterogeneity that moderate the main effect: The premium only exists when the entrepreneurial spell was successful, and happened recently in a related industry. In other words, experience as a business owner is not enough to grant them a higher pay, as firms only value certain types of entrepreneurial experience.

Chapter 2

Student Employment and Entrepreneurship

Adrian L. Merida

Department of Strategy and Innovation

Copenhagen Business School

Raquel Justo

Department of Economics

University of Huelva

2.1 Introduction

Entrepreneurship rates among recent graduates remain very low. On average, the share of students creating a business within the few years after graduation is below 6% in the U.S. (Åstebro et al. 2012; Lerner and Malmendier 2013) and barely half of that figure across European universities (Bergmann et al. 2016; Larsson et al. 2017). As a consequence, there has been an increasing emphasis on the implementation of policies that encourage and facilitate entrepreneurial activities of such young graduates (Jansen et al. 2015; Roach 2017). Specific measures include the incorporation of subjects and courses focused on entrepreneurship, the execution of activities and initiatives to foster an entrepreneurial attitude among students, as well as the establishment of incubators to offer support for those students interested in putting their business ideas into practice. Yet, the effectiveness of these programs are still questioned in the literature (Martin et al. 2013), and practical experiences may act as effective complements to theoretical education and mentoring (Nelson and Monsen 2014).

In this sense, working while studying represents a possible channel through which students can learn not only about the real industry, but also about their own preferences with regard to working for someone else in comparison with what self-employment might bring them. Student employment an increasingly common phenomenon in the majority of the modern countries (Creed et al. 2015; Orr et al. 2011; Scott-Clayton 2012). Accordingly, there is a growing body of literature focused on this phenomenon. Broadly speaking, extant research has focused on the impact of student employment on academic performance (Ehrenberg and Sherman 1987; Stinebrickner and Stinebrickner 2003) and on subsequent labor market outcomes (Häkkinen 2006; Light 2001; Ruhm 1997). Therefore, it can be concluded that policies facilitating student employment have the potential to shape subsequent labor market success of young graduates (Scott-Clayton and Minaya 2016). However, its potential effects on entrepreneurial behavior have not yet been considered, to the best of our knowledge. This paper helps to shed light on this topic and fill such a gap in the literature by providing a first set of empirical evidence on the effects of working while studying on subsequent entry into entrepreneurship.

Arguments can be made supportive of both a positive and a negative effect of student employment on entrepreneurial entry. On the one hand, working while studying allows students to acquire and develop skills and networks (Humburg and Van der Velden 2015; Passaretta and Triventi 2015)

and may serve as a signal to differentiate from other graduates and attract potential employers (Baert et al. 2016; Weiss et al. 2014). From this perspective, students who worked before graduating should be more likely to receive job offers in the paid sector, thereby reducing their interest in becoming entrepreneurs, as they face a greater opportunity cost in their decision to start up a business. On the other hand, active participation in the labor market enables the recognition of business opportunities (Singh et al. 1999; Ucbasaran et al. 2008), particularly in small firms (Dobrev and Barnett 2005; Gompers et al. 2005; Sørensen 2007a). Moreover, there is evidence that a diverse academic or professional background is positively associated with entrepreneurial behavior (Lazear 2004, 2005). These last arguments support the possibility that student employment increases the likelihood of engaging in entrepreneurship, or at leas that the effect may be moderated by the size and the diversity of the firms where students work before graduating.

In the presence of such competing arguments, we take an empirical approach in order to tackle this matter. By means of comprehensive administrative data from Denmark, this paper examines the extent to which student employment affects the post-graduation entrepreneurial behavior of young university students. Our sample contains over 200,000 students enrolled in university programs and belonging to multiple cohorts, which we can follow after they exit college thanks to the longitudinal dimension of our database. In line with what previous studies report (e.g. Åstebro et al. 2012; Bergmann et al. 2016), only 1.50% of the students in our sample become entrepreneurs within the first three years after finishing their studies. Concerning student employment patterns, almost 88% of the students had at least some work experience during their college time, although the intensity of student employment varies substantially.

Initial analyses point to a negative impact of student employment on the likelihood of engaging in entrepreneurship upon exiting college. However, because this relationship may be subject of endogeneity issues coming from unobserved traits such as ability or overconfidence—thus rendering unreliable estimates—, we further perform instrumental variable regressions. In particular, we employ three different instruments to deal with the confounding effects of unobserved heterogeneity: (i) average regional unemployment rates during the enrollment period, (ii) the share of the total enrollment period that students lived with their parents, and (iii) a policy change that took place in Denmark in 1996 whereby the maximum amount that students were allowed to earn from labor market activities while still being eligible for a study grant was raised by 32.5%, thus incentivizing them to work more intensively than before.

Interestingly, results turn positive after accounting for endogeneity. Moreover, the relationship is stronger among students who worked in small firms or in a variety of firms and industries. This set of evidence seems to indicate that enrollees who sort into student employment are, on average, less attracted to entrepreneurship in the first place. However, their contact with the labor market seems to change their attitude towards entrepreneurship and they develop a preference for entrepreneurship, perhaps motivated by the identification of business opportunities or due to the acquisition of diverse human capital. The new insights provided by this study open alternative venues for policy makers interested in boosting the rates of graduate entrepreneurs.

The remainder of this paper is structured as follows. Section 2.2 discusses the extant literature and provides context to our contribution. The data employed in the analysis is described in section 2.3, while section 2.4 explains the empirical approach. Section 2.5 presents the main results, and section 2.6 contains additional analyses on some of the potential mechanisms behind the results. Finally, section 2.7 concludes this study.

2.2 Related Literature and Theoretical Considerations

A considerable number of students has some part-time employment, either during vacation periods or the academic year and students are nowadays more likely to work while enrolled at university than they used to in the past (Darolia 2014; Orr et al. 2011). For instance, Scott-Clayton (2012) report that around 50% of young students in higher education programs in the U.S. combine work and study to some extent, while only one out of four devote their entire time to college. In the U.K., Robotham (2012) found that 67% of the students in their survey held a job during term time, and Creed et al. (2015) report that the share of enrollees working while studying in Australia was about 20% in the seventies, increased to 54% in the 2001 and escalated to 72% in 2007.

Given this generalized trend, many scholars have directed their attention to the analysis of the potential effects of student employment on a variety of outcomes. Previous studies have reported negative effects of student employment on academic performance (Derous and Ryan 2008; Kalenkoski and Pabilonia 2010; Stinebrickner and Stinebrickner 2003) often due to changes in the daily routine and a reduction in hours devoted to study (Dustmann and Van Soest 2007; Triventi 2014). On the other hand, working while studying does help reduce subsequent struggles to afford

one's own education (Häkkinen 2006), although financial constraints are not necessarily the most important trigger of student employment.

As the number of students successfully graduating from university programs rises, holding a university degrees is becoming less informative and is no longer a sufficiently credible signal to stand out over the rest (Passaretta and Triventi 2015). Thus, student employment can act as a differentiation signal to appeal to potential future employers (Baert et al. 2016; Weiss et al. 2014). This signal might indeed be justified if working while studying allows students to acquire skills and knowledge complementary to academic concepts (Humburg and Van der Velden 2015; Passaretta and Triventi 2015). In line with traditional theories of human capital investment (Becker 1962; Mincer 1958), it can be argued that student employment allows acquiring work experience, developing practical skills for work and obtaining new knowledge. Even more, student employment may help young individuals foster certain non-cognitive traits. For instance, work experience may promote self-esteem, a higher sense of responsibility, and job values such as being punctual and collaborating with other workers (Carr et al. 1996; Helyer and Lee 2014). Additionally, from a social network perspective (Coleman 1988; Granovetter 1977), the social bonds arising from the in-school work should help maximize future outcomes.

If student employment acts as a signal for potential employers, enables the acquisition of relevant skills for work before entering the labor market, and opens the possibility of networking, then it is likely that those who worked while studying will receive more job offers. This means that the opportunity cost they face when deciding whether to start up a business would be greater, due to better outside options in the wage employment sector. Yet, it is not quite clear whether student employment relates positively with the likelihood of finding a job or with initial earnings. Indeed, results have been mixed in terms of how student employment relates with the likelihood of finding a job and with initial earnings. Some studies did not find any significant effects on future wages, either in the short or in the long term (Carr et al. 1996; Ehrenberg and Sherman 1987; Parent 2006) and some even reported negative effects in some instances (Baert et al. 2016; Hotz et al. 2002). Others, however, did find convincing positive effects of working while studying on subsequent labor market outcomes such as wages and the probability of finding a stable job (Häkkinen 2006; Light 1999, 2001; Ruhm 1997).

On the other hand, several arguments can be brought up to expect a positive effect of student employment on entrepreneurial entry. Flexible schedules that leave enough room for leisure time

have become increasingly important with every new generation (Twenge et al. 2010), but working schedules in the wage employment sector tend to be stricter than in alternative occupations such as self-employment (Hyytinen and Ruuskanen 2007). Student employment might allow them to quickly realize that they do not enjoy receiving orders from a boss and having to follow a tight schedule, and that the higher autonomy and flexibility of entrepreneurship might allow them to maintain a similar lifestyle compared to when they were still in college.

Moreover, student employment may enable the identification of business opportunities and the development of skills through active participation in the labor market (Singh et al. 1999; Ucbasaran et al. 2008). Opportunity recognition is particularly possible when working in small firms (Elfenbein et al. 2010; Sørensen 2007a), which also allows learning directly from the employer (Gompers et al. 2005), and facilitate the spawning of new ventures by former employees compared to larger, more rigid incumbent firms (Dobrev and Barnett 2005). Due to these—and potentially other—factors, the literature has consistently found that employees working in small firms are more likely to engage in entrepreneurship than other workers—the "small firm effect" (Elfenbein et al. 2010). Besides working in small firms, having a diverse academic or professional background has also been found to positively correlate with entrepreneurial entry (Lazear 2004, 2005). Therefore, students who work in small firms or in multiple firms could become more likely to found their own businesses. We test and further discuss these possible mechanisms in additional analyses.

These are merely some of many arguments that could be made to develop expectations in either direction. Because this is an unexplored territory and given that it is not trivial to discern which effects will dominate, we do not formally propose any hypothesis or theoretical prediction. Instead, we will carry out a thorough empirical analysis to provide consistent evidence of the extent to which experience earned through student employment affects entrepreneurial entry, thereby adding to both the literature on student employment and the one on determinants of entrepreneurship.

2.3 Data

This study employs comprehensive administrative panel data from the registers of Denmark. This database is gathered and maintained on a yearly basis by Denmark Statistics, and it comprises the entire population of individuals existing in this country, combining information relative to the individuals' actual education and labor market histories. More specifically, this unique database

provides accurate information of a wide variety of characteristics, ranging from personal attributes (such as age, gender, geographic location or number of children), education records (such as type of degree and field of study), labor market experience (including details of employers, industries, and type of occupation), and income registers. The longitudinal structure of the data allows tracking such information of all individuals living in Denmark every year. Moreover, this database allows linking individuals to their parents, which we exploit in order to obtain information on parental education, entrepreneurial experience, income, and wealth.

2.3.1 Sample Construction and Definitions

We begin by identifying the population of Danish students who enroll in a tertiary education program for their first time in 1991 onwards. We code individuals as students in a given year if they appear registered in a tertiary education program. Because we are interested in how working while studying shapes the entrepreneurial behavior of young, inexperienced individuals, we restrict out sample to those aged 18 to 23 when they first enroll in university. Thanks to the longitudinal extension of our data we are able to include multiple cohorts of enrollees. In particular, we examine the cohorts of 1991 to 2009, making up for a total of nineteen waves of students.

Identifying the last year of studies is not trivial, as students take heterogeneous paths leading to their degrees. For example, exit from university could happen after one or several years of enrollment, with the student achieving none, one or multiple degrees of different levels (Bachelor's and/or Master's) and with gap years in between degrees. In order to simplify our analysis and to discard lingering students and those who are predisposed to an academic profession, we only keep students who do not enroll in more than two tertiary education programs, do not study a Ph.D., and finish their studies (successfully or not) in a maximum of ten years. We also drop students who spend two or more years abroad, as we cannot observe their employment records when they are not residing in Denmark. Finally, we drop students graduating from arts and military programs.[1]

We consider that a student has finished their studies if she does not appear registered in any tertiary education program for more than two years in a row. A limitation of our dataset is that it does not explicitly state if a student aborted her studies. Failure to identify whether a student

[1] Less than 6% of the students enrolled in more than two tertiary education programs, and the share of students who are still enrolled in some tertiary education program more than 10 years after they began their studies was smaller than 3%. The share of Ph.D. graduates was below 2.75%, and only 1.66% of students spent two or more years abroad in the period of enrollment. In addition, graduates from arts and military programs accounted for 1.07% and 1.50% of the sample, respectively.

is a dropout or a successful graduate might lead to biases results. For example, intensive student employment is likely to increase the likelihood of dropping out (Ehrenberg and Sherman 1987), and it is possible that dropouts become self-employed at higher rates than graduates (Buenstorf et al. 2017). In order to tackle this issue, we follow the approach employed by Buenstorf et al. (2017), so we classify students as dropouts if they do not appear registered in the program they were attending for two consecutive years and do not obtain the degree they were pursuing.

In order to measure student employment, we make use of a variable which ranges from 0 to 1 and indicates the share of a total year of experience that the individual gathers in a given year. When this variable equals 0 it means the individual did not work at all during the year, while a value of 1 implies the individual worked full-time during the entire year. Our main measure of student employment variable is the sum of this variable over the period of enrollment. Hence, it is a continuous variable which accounts for the total accumulated work experience during the enrollment period.[2] Finally, our dependent variable takes value 1 if a person is an entrepreneur in any of the first three years after graduation. We define an individual as an entrepreneur when her main occupation in a given year is self-employment (with or without employees).

2.3.2 Descriptive Statistics

Our final sample includes a total of 204,403 students. Figure 2.1 shows the number of students that we observe at each year of enrollment, by type of exit from university. Dropouts are the minority of our sample, and they are more represented in the early years, which suggests that dropout rates are almost negligible when students have been enrolled for several years. Those who exit university with a Bachelor's degree are the dominant group among students who spend less than 4 years enrolled, but those who pursue and complete Master's studies are over-represented from year 5 onwards. Moreover, Figure 2.2 depicts the average experience gained through student employment as a fraction of what a full year of work would provide, by year of enrollment. It appears evident that student employment is more common in late years of enrollment rather than during the early years, although the average experience gained is always less than half a year.

Table 2.1 shows descriptive statistics of all the individuals in our sample. Only 3,011 individuals (1.50%) engage in entrepreneurship at some point during the first three years after exiting college. While this number may appear extremely small, the low proportion of students attempting self-

[2] In robustness tests using endogenous treatment effects models we use a dummy variable which takes value 1 if the student had any amount of experience through student employment, and 0 otherwise.

employment is in fact rather usual. Students sorting into entrepreneurship upon graduation are a small minority across different universities and countries (Åstebro et al. 2012; Bergmann et al. 2016; Larsson et al. 2017). The average age of enrollment among individuals in our sample is 21, with the majority of them being female (62%). Having children is fairly uncommon, and most students did not live with their parents while enrolled at university. The majority of the students in our sample come from the Capital region, followed by Central Denmark. Moreover, our data includes information on the grade point average that students had in high-school. We use this variable in our analysis as a way to reduce concerns from unobserved ability.[3]

On average, students in our sample had accumulated slightly over a full year of work experience prior to their first enrollment in tertiary education. Indeed, in Denmark it is not uncommon that students take a gap year after high-school, which they often employ to get an initial contact with the labor market. In terms of fields of study, Business, Pedagogy, and STEM are the most dominant ones. Furthermore, the share of dropouts in our sample is 13%, whereas bachelor graduates represent almost 60% of the total, which seems to be in line with figures from OECD (2013). The average number of years spent at university is just above four.

Finally, it appears evident that student employment is rather common among Danish students, as almost 88% of them have had some working experience while enrolled at university. However, the average experience gained is just 0.20, suggesting that students mostly devote their time to their studies. This idea is reinforced by the fact that, on average, the total accumulated work experience through student employment is below one full year. Therefore, it seems that Danish students are eager to participate in the labor market[4] but there is a substantial degree of heterogeneity in the *intensity* of student employment, which we exploit in our analysis. In terms of the size of the firms where they work while enrolled, it appears that most of the students who work tend to do it in large firms compared to small firms. Finally, they tend to work in less than two different firms and industries while still enrolled at university.

[3] Since working while studying has a direct impact on academic performance (Kalenkoski and Pabilonia 2012; Stinebrickner and Stinebrickner 2003; Triventi 2014), using grades from university would be less reliable than using grades from high school. This is because grades in high school are evidently not affected by student employment taking place while in college. Moreover, high school GPA is one of the strongest predictors of college GPA (Cohn et al. 2004), and it also affects labor market performance (French et al. 2015; Rose and Betts 2004). Hence, high-school GPA may be used as a proxy for ability.

[4] Besides the willingness of students to work while enrolled, the availability of jobs in the labor market should also be considered in the analysis. Although we cannot explicitly account for the availability of jobs, we do include year fixed effects in our analyses to capture the state of the economy.

2.4 Empirical Strategy

The goal of our analysis is to estimate the impact of the intensity of student employment on the probability that students engage in entrepreneurship upon exiting college. A naive specification could be as follows:

$$ENT_i = \alpha_i + \beta EXP_i + \gamma X_i + u_i \tag{2.1}$$

where ENT_i is a dummy variable that equals 1 if the individual becomes an entrepreneur in any of the first three years after exiting college; EXP_i represents the total experience that the individual accumulated through student employment (thus making β our coefficient of interest); X_i is a vector of control variables specific to each individual; and u_i is the error term due to unobserved factors. Importantly, there are reasons to believe that EXP_i might be correlated with u_i in the above equation 2.1. That is, accumulated experience through student employment is likely to be endogenous.

The decision to become an entrepreneur is motivated by certain unobserved traits that could also explain selection into student employment. For example, overoptimistic and overconfident individuals are known to be more likely to engage in entrepreneurship (Dushnitsky 2010; Hayward et al. 2006; Lowe and Ziedonis 2006), and it is possible that this type of students also overestimate their capability to combine their studies with a paid job. Likewise, more able individuals may have more opportunities to find a paid job and to effectively balance work and study, while also being more likely to start up a firm. It may even be the case that individuals with a predisposition to become business owners decide to work prior to finishing their studies in order to learn how business is performed (Gompers et al. 2005). In either case, conventional OLS estimations would yield inconsistent and potentially biased results (Wooldridge 2010).

In order to address this potential problem of endogeneity, we rely on instrumental variable (IV) regressions. The idea is to identify an additional variable Z_i that is not correlated with the error term, i.e., $Cov(Z_i, u_i) = 0$, and is partially correlated with the endogenous variable EXP_i even in the presence of the other control variables. Of course, finding an instrument is not an easy task. In our particular case, we need to find a variable that does not directly affect entry into entrepreneurship, but only through its connection with selection into student employment. We propose three different instruments.

Our first instrument is the average regional unemployment rate during the enrollment period. This instrument has been used in the past in similar works (e.g. Häkkinen 2006; Joensen 2009). The rationale is that students have smaller chances of finding a paid job before graduating when labor market conditions are poor, but past macroeconomic conditions should not affect current (post-graduation) labor market outcomes—provided that current unemployment rates are controlled for. The second instrumental variable is the share of the total enrollment period that students lived with their parents. We posit that living with one's parents reduces the urgency to find a job, even in the absence of a grant. However, we see little chances of it affecting the decision to become an entrepreneur after graduation, particularly after controlling for parental entrepreneurial experience and finances.

Out last instrumental variable is a policy change that took place in Denmark in 1996. In this country, all university students over 18 years old are entitled to receive a grant to continue with their studies, provided that they are completing their courses according to the schedule.[5] The grant is limited to a maximum of DKK 47,000 per year, but the final amount depends on whether they work while studying and, in particular, how much income they earn. If annual earnings from student employment surpass a threshold, the grant is reduced accordingly. Such threshold was raised in 1996 from DKK 47,000 per year to DKK 60,000 per year (Joensen 2009). This policy change encouraged enrollees to work while studying (see figure 2.3), but it is very unlikely that it affected their post-graduation entrepreneurial intentions except indirectly, through its impact on student employment. By utilizing such a reform, we hope to better identify the effect of student employment on entrepreneurial intentions.

However, before diving into the association between student employment and entrepreneurial behavior, we first try to identify what kinds of students are more likely to work while studying. Since student employment is not randomly assigned among individuals, it is both necessary and interesting to understand which students are more likely to decide to work while enrolled at tertiary education. In this case, we exploit the longitudinal dimension of our dataset to perform panel OLS estimations of the experience gained through student employment as follows:

$$EXP_{it} = \alpha_i + \beta X_{it} + \gamma D_i + \epsilon_{it} \tag{2.2}$$

[5] The maximum length of the grant is 70 months.

where EXP_{it} is the experience gained by individual i at year t while enrolled at university; X_{it} is a set of contemporaneous time-varying characteristics; D_i is a vector of time-invariant characteristics; and ϵ_{it} is the error term, which varies across individuals and over time.

2.5 Results

2.5.1 Determinants of Student Employment

Table 2.2 contains estimates of the experience gained at year t through student employment. The model has been estimated by means of panel OLS regressions with robust standard errors clustered at the individual level.

Current unemployment rates at the region of study significantly decreases the amount of experience gathered at the current year. This is in line with results in Häkkinen (2006) and Joensen (2009). Likewise, students living with their parents gain significantly less experience while enrolled than their counterparts living away from their parents, which is also in line with our expectations. Moreover, and as expected, the amount of annual experience gained in years following the reform of 1996 is significantly larger than in years prior to the reform. These results give us confidence about using such variables as potential instruments in subsequent regressions.

Individuals who enrolled at later ages seem to gain more experience through student employment, as do female students compared to their male colleagues. Having children is negatively related to experience gains, particularly for the case of female students. More able individuals seem to work less intensively, while experience prior to graduation is positively associated with current gained experience. Compared to students from IT & Communications, those from the fields of Pedagogy, Health, and Business tend to work more intensively while the opposite is true for those studying STEM programs. Having parents with tertiary education or with entrepreneurial experience is negatively associated with experience gained at the current year. Further, increases in parental income increase the amount of time that students work while for the case of parental assets the reverse is true. In terms of geographical distribution, those living in North Denmark gather significantly less experience than students from all other regions except for Central Denmark. Finally, the amount of experience gained decreases every year during the first 5 years of enrollment, but increases thereafter.

2.5.2 Student Employment and Entrepreneurship

Our main set of results are displayed in Table 2.3, which includes estimates of the impact of accumulated experience gained through student employment on the propensity to engage in entrepreneurship within the first three years after the end of the enrollment period. The table is structured in two different panels, panel A and panel B, which display results from estimations without and with controls, respectively. Each of the five columns report estimates from different models and specifications. Column (1) exhibits estimates from (endogenous) OLS regressions, while each of the three instruments is used step by step in columns (2) through (4). Finally, column (5) contains estimates from IV regressions where the three instruments are used simultaneously.

Results in panel A are, of course, prone to several sources of endogeneity, mostly coming from omission bias, as no controls are included in these models. However, they may prove useful to understand how the main effects are affected by the inclusion of the full set of controls in panel B. The estimate from the OLS regression points to a negative relation between accumulated experience through student employment and entrepreneurial entry. When using the average regional unemployment rates during the enrollment period as an instrument, in column (2), the coefficient turns positive and significant. This same pattern occurs when using the policy change of 1996 as an instrument in column (4). However, when experience is instrumented with the share of total enrollment period that students live with their parents, the estimate remains negative and significant, and when plugging all instruments at the same time, the effect is practically zero. In all cases, the tests of excluded instruments reject that the instrumental variables are weak, and the endogeneity tests mostly confirm that the relationship between these two variables is indeed endogenous.

Moving now to panel B, the controls included are a set of characteristics which are expected to explain selection into entrepreneurship. In order to discard the possibility that the effects that we observe are due to transitions driven by necessity reasons, we included a variable that indicates whether the student is unemployed in the first year after graduation. Moreover, because venture creation is likely to be affected by current macroeconomic conditions, we added the average regional unemployment rate during the three years after exiting college as an additional regressor. High-school GPA is included as a proxy for ability, which is known to affect selection into entrepreneurship (Åstebro et al. 2011; Elfenbein et al. 2010). Because students from different fields of education are likely to develop different entrepreneurial knowledge and preferences, we also in-

cluded education field dummies. Moreover, dropouts are more likely to start up a company than other students (Buenstorf et al. 2017), perhaps because they precisely quit their studies to pursue a business opportunity. Hence, we control for the type of exit from college by distinguishing between dropouts, Bachelor graduates, and Master's graduates. Parental background is also likely to affect students' decision to become entrepreneurs, particularly parental entrepreneurial experience, so we also included their corresponding controls. Other controls include standard variables such as age, gender and children.

We observe that the estimate from the OLS regression remains virtually untouched despite the inclusion of the full set of control variables. However, all the IV regressions point to a positive and significant effect. Furthermore, the coefficients are similar in magnitude: the coefficients range from 6.8 to 9.8 percentage points. In column (5), where the three instruments are used simultaneously, an additional year of experience earned through student employment is estimated to increase the probability of becoming an entrepreneur within three years after exiting college by 7.5 percentage points. Once again, we can reject the hypothesis that the instruments are weak in all models, and all endogeneity tests confirm that the relationship was endogenous. Importantly, the overidentification test in column (5) is not significant, which implies that all instruments are valid when used simultaneously. This, together with the fact that all the IV coefficients are positive, significant, and of similar size, increases our confidence in our results.

2.5.3 Robustness Check: Endogenous Treatment Effects

After having established that work experience accumulated while enrolled at university positively affects entrepreneurial entry, we now move to a different methodology to corroborate such results. In spite of the fact that the instruments appeared to be valid according to the tests of overidentification and excluded instruments, and even though all the estimates were strikingly similar, there might still be concerns as to the theoretical adequateness of such instruments. For example, Baert et al. (2016) argued that the use of local unemployment rates during the enrollment period as an instrument might not be appropriate if students were already looking for a (long-term) job before exiting college. Hence, in this robustness exercise we address our analysis by means of a different methodology which does not rely on instrumental variables.

In this test, we use a binary variable that equals 1 if the student had any sort of student employment and 0 otherwise, and we take it as a treatment variable to estimate the average

treatment effect (ATE) and the average treatment effect on the treated (ATET). The method of endogenous treatment effect is based on a control-function approach, which implies that the residuals from the treatment equation are used as a regressor in the outcome model. The procedure requires that both the selection and the outcome equations are modeled carefully. We make use of a wide range of control variables to craft specific models for the explain selection into student employment (the treatment model) as well as selection into entrepreneurship (the outcome model).[6]

Results from endogenous treatment effects are displayed in table 2.4.[7] Column (1) reports the estimated average treatment effect whereas column (2) contains the average treatment effect on the treated. Both coefficients are positive and significant, in line with results from table 2.3. While it is not our goal to make strong causal interpretations, one could interpret the results in the following way. If no student worked while enrolled, the average probability to engage in entrepreneurship after graduation would be 0.3%, whereas if all students worked while enrolled the probability would increase by 1.6%. In the population of students who work while studying, the average probability to engage in entrepreneurship would be 0.1% if none of them had any kind of student employment, but their probability is increased by 1.3% when they engage in student employment.

All in all, it appears evident that working while studying more intensively makes students more likely to become entrepreneurs once they finish their studies. More precisely, if one does not correct for selection based on unobserved heterogeneity, then it appears that those who worked while studying end up being less likely to engage in entrepreneurship. However, after correcting for the potential influence of such unobserved factors with two alternative econometric approaches, we have found that student employment actually increases their likelihood of becoming entrepreneurs.

2.6 Discussion and Additional Analyses

The fact that the OLS estimate was negative while the IV estimates are positive may be suggesting that, on average, students who sorted into student employment had a preference against

[6] To perform the endogenous treatment effects estimations, we use the STATA command called eteffects. We refer to the manual for further details about this method.

[7] It must be noted that both the selection equation and the outcome model are estimated through probit regressions. This differs from the results in table 2.3, where estimates were obtained through (two-stage) least squares regression analyses. We also performed the endogenous treatment effects method with least squares estimations for the outcome models and results were virtually identical, just about double the size. However, because the dependent variable is binary, probit regressions are preferred to model the outcome, and also to avoid obtaining negative potential-outcome means.

entrepreneurship—or rather, a preference for wage employment. In other words, prior to the student employment experience, they were less prone to engaging in entrepreneurship than their counterparts who did not work while studying.

It seems plausible that they regarded student employment as a mean to gather relevant work experience, develop specific skills, and send a signal of differentiation to attract future potential employers. Yet, after some time working in a given company, they may have developed a preference for entrepreneurship. This change in their entrepreneurial preference could be due to several reasons. First, it could reflect that they identify –or at least believe that they have identified– a business opportunity, since working enables opportunity recognition by directly participating in the market (Singh et al. 1999; Ucbasaran et al. 2008). This could be particularly true if they worked in small firms, where learning directly from the entrepreneur is possible (Gompers et al. 2005), and business opportunities might be more apparent (Elfenbein et al. 2010; Sørensen 2007a). In addition, the literature indicates that a varied employment history is positively associated with subsequent business ownership (e.g. Lazear 2004, 2005; Lechmann and Schnabel 2014; Santarelli and Vivarelli 2007; Wagner 2003, 2006). If these arguments hold, then we would expect that the positive effect of student employment on subsequent entrepreneurial entry should be more pronounced for those who worked in small firms and for those with a more varied curriculum in terms of different firms and/or industries. We now discuss and test these two potential mechanisms.

2.6.1 Student Employment in Small Firms

A generalized finding in the entrepreneurship literature is that workers employed in small firms tend to be more likely to become entrepreneurs than those working in large companies (Dobrev and Barnett 2005; Gompers et al. 2005; Sørensen 2007a; Sørensen and Fassiotto 2011), a phenomenon that is known as the "small firm effect" (Elfenbein et al. 2010). To be an entrepreneur, it is optimal to acquire certain skills, such as leadership, planning, decision making, problem solving, team building, communication and conflict management (Shane et al. 2003). Obtaining and improving these skills reduces business uncertainty and helps to take advantage of business opportunities (Van Praag and Cramer 2001). Such skills are more accessible if the company in which the individual acquires experience is of smaller size, because the employee can observe closely and learn directly from the behavior of the employer (Gompers et al. 2005), as well as identify potential business opportunities with more accuracy (Elfenbein et al. 2010; Sørensen 2007a). Moreover, the fact that

small firms tend to be less rigid and bureaucratic than larger firms may facilitate the spawning of new ventures created by former employees (Dobrev and Barnett 2005), who can also benefit from the network of suppliers and customers of the incumbent firm (Gompers et al. 2005).

The factors discussed above also lead to a better understanding of the employees in small firms about their own entrepreneurial potential and about the feasibility of potential business opportunities before putting them into practice, which results in a positive selection of entrepreneurs who end up performing better than the average (Elfenbein et al. 2010). However, despite the substantial amount of evidence suggesting that small firms spawn a larger share of entrepreneurs, scholars have shown concerns as to whether the small firm effect is due to treatment or selection (Sørensen and Fassiotto 2011). In this sense, using register data from Denmark, Sørensen (2007a) found robust evidence of a treatment effect of small firms on entrepreneurial intentions of employees, after convincingly addressing the potential strategic sorting of nascent entrepreneurs into small firms in order to gather experience and knowledge relevant for entrepreneurial purposes. However, Elfenbein et al. (2010) found that sorting of individuals into small firms based on their preference for entrepreneurship and on their ability also played a relevant role in explaining the small firm effect. In any case, whether the inverse relationship between firm size and entrepreneurial spawning is explained by selection or treatment effects is not something that we try to disentangle in this paper. Rather, we simply consider that such association exists, and acknowledge that it might moderate the effects of student employment and subsequent entrepreneurial behavior.

In panel A of table 2.5, we test for the small firm effect in two different ways: with a continuous measure, and with a dichotomous measure. The continuous measure is the logarithm of the average size of the firms where the student worked while enrolled at university, and its impact is displayed in columns (1) and (2) of panel A. For this variable, both OLS and IV regressions report a negative effect on entrepreneurial entry. That is, the larger the (log) average size of the firms where students work while studying, the smaller the probability that they engage in entrepreneurship. In columns (3) and (4) of panel A we restrict the sample to individuals who have only worked in either small or large firms. We then examine whether those who only worked in small firms have a higher propensity to engage in entrepreneurship than those who have experience in large firms only.[8] Once again, results from OLS and IV report a stronger effect of working in small firms compared to working in large firms. While in both cases the OLS and IV estimates coincide in the sign and

[8] The cut-off for defining a small and a large firm is 50 employees. Estimations using other thresholds, such as 10 and 25, yielded equivalent results.

the significance, the magnitudes are substantially larger in the latter ones. Hence, when the effect of unobserved preferences is reduced, the effect of working in small firms becomes even larger. This might hint that the small firm effect is mostly due to treatment rather than selection (Sørensen 2007a; Sørensen and Fassiotto 2011). However, even if our instrumental variables are appropriate to instrument selection into student employment, it is possible that they cannot fully capture the motivations to sort into small firms. Hence, our conclusion that selection may be less important than treatment should be taken with a grain of salt.

2.6.2 Diverse Student Employment

According to (Lazear 2004, 2005), individuals with a varied background, either academic or professional, tend to develop a more general set of skills, and are in turn more likely to become entrepreneurs. Thus, entrepreneurs can be classified as jacks of all trades, as opposed to wage employees, who tend to specialize on a narrower set of tasks. Using data from Stanford alumni, he showed that entrepreneurship is a more likely occupation for those who take more varied courses and those who have a more diverse professional background.

Such results have found support in several other studies. For instance, using German micro data, Wagner (2003) showed that, on average, self-employed workers changed professions more often and had more kinds of professional training. Later studies reinforced the idea that a more varied professional curriculum is positively associated with future business ownership (Lechmann and Schnabel 2014; Santarelli and Vivarelli 2007; Wagner 2006), and facilitates opportunity recognition (Ucbasaran et al. 2008).

In general, most of the papers above approximate a diverse background with the number of different jobs and/or industries in which individuals worked in the past. We follow past works on this topic and examine the role of diverse student employment both in terms of firms and industries. The results can be found in Panel B of table 2.5. Specifically, columns (1) and (2) provide estimates of diversity of firms whereas columns (3) and (4) refer to diversity of industries. The way we approach it is to restrict the sample to those students who have worked while enrolled, and compare those who have only worked for one firm to those who have worked for multiple firms. The analysis for the case of industry diversity is analogous. Results point to a higher entrepreneurial activity among those who have worked in multiple firms or in multiple industries. Just as results from panel A, estimates from the IV regressions are larger in magnitude. However,

to the extent that it is unclear whether our instruments can account for aspects like preference for diversity, we refrain from making strong conclusions in this particular topic. What we can conclude is that our results demonstrate not only that student employment shapes entrepreneurial intentions of young students—to the point of maybe even creating such intentions—, but also that its effects are heterogeneous and depend on the type and number of firms where students work, as well as on industry diversity.

2.7 Conclusion and Implications

Promoting entrepreneurship at universities has become a popular policy among governments across the world during the last couple of decades, yet entrepreneurial rates among graduates are lower than among the less educated population. Such a situation might reflect ineffective policies that do not fulfill their mission to encourage young graduates to engage in entrepreneurship. For example, numerous entrepreneurship education programs have been implemented in multiple universities of different countries, but effects on entrepreneurial intentions and performance have been mixed (Elert et al. 2015). Thus, it is likely that students themselves long for more practical experiences rather than attending theoretical lectures. In this context, our paper provides the first set of empirical evidence on the effects of student employment on the entrepreneurial propensity of young university students. We employed an extremely rich and detailed database from the registers of Denmark to identify the population of Danish students enrolling in university from 1991 onwards. We then tracked their student employment records and assessed their impact on entrepreneurial entry within the first three years after graduation. In order to address the challenge of endogenous relationships between working while studying and entrepreneurial intentions, we proposed and implemented three instrumental variables. The first instrument was the average regional unemployment rates during the enrollment period, while the second one was the share of the total enrollment period that students lived with their parents. For the third instrument, we exploited a policy change that occurred in 1996 which raised the total income that students were allowed to earn in order to still be eligible to receive the full amount of student grant. Robustness tests yielded similar results to our IV regressions, which gives us confidence about their validity.

Taken together, our results make two main contributions. First, naive estimations suggested that the effect of working while studying on subsequent entrepreneurial entry is negative. How-

ever, once we corrected for the influence of unobserved heterogeneity by applying instrumental variable regressions, the coefficients flipped signs and turned positive. This suggests that working while enrolled does shape the attitude towards entrepreneurship of such young undergraduate students. It appears that students who sort into student employment initially have a certain aversion towards entrepreneurship. However, after being exposed to the actual labor market by working while still enrolled at university, they develop a preference for entrepreneurship and end up being more likely to start up a firm compared to the counterparts who did not work while studying. Second, additional analyses revealed that the positive effect of student employment on entrepreneurial propensity is stronger among students who worked in small firms, as well as when student employment is diverse in terms of number of different firms and/or industries. The fact that student employment appears to shape entrepreneurial intentions, and that its effect depends on such factors might provide alternative venues for policy makers interested in boosting the rates of graduate entrepreneurs.

Finally, our study is not exempt from limitations. While we were able to explicitly test for the role of firm size and diversity of industries and employers, there may be several other mechanisms which might be equally interesting to tease out. For instance, it is possible that students are influenced by other entrepreneurial colleagues that they meet at the workplace. Moreover, effects might be sensitive to the type of contract that they had. For example, effects could differ depending on whether the student worked mostly in summer jobs or if she had to combine her study time with a part-time work for the entire year. Similarly, further differences might arise if incorporated entrepreneurs could be teased out from unincorporated self-employed workers. We believe these are interesting venues for further research, and we encourage scholars to follow them in the future.

Table 2.1: **Descriptive statistics**

	Mean	S.D.
Demographic information		
Entrepreneur within 3 years after exiting college (Y/N)	0.015	0.121
Age at first enrollment year	21.182	1.211
Female	0.620	0.485
Children (Y/N)	0.077	0.267
Living with parents while enrolled	0.243	0.293
Region: North Denmark	0.113	0.317
Region: Central Denmark	0.253	0.436
Region: Southern Denmark	0.182	0.386
Region: Capital	0.367	0.482
Region: Zealand	0.085	0.279
High-school GPA	6.383	0.666
Years of experience before first enrollment	1.159	2.158
Regional unemployment rates while enrolled	6.897	2.408
Regional unemployment rates, first 3 years after exiting college	5.752	1.686
Unemployment in the first year after exiting college	0.092	0.289
Parental background		
At least one parent with tertiary education	0.503	0.500
At least one parent with entrepreneurial experience	0.338	0.473
Parental income (thousands of 2000 DKKK)	2,759.706	3,352.173
Parental net assets (thousands of 2000 DKKK)	4,312.987	17,233.700
Academic information		
Field: Pedagogy	0.236	0.425
Field: Health	0.179	0.383
Field: IT & Communications	0.115	0.319
Field: STEM	0.229	0.420
Field: Business/Economics	0.242	0.428
Type of exit: Dropout	0.130	0.337
Type of exit: Bachelor graduate	0.598	0.490
Type of exit: Master's graduate	0.272	0.445
Duration of enrollment period (years)	4.409	2.017
Student employment		
Ever worked while studying (Y/N)	0.877	0.329
Experience gained per year	0.204	0.190
Total year of accumulated experience	0.858	0.830
Experience in small firms (Y/N)	0.406	0.491
Experience in large firms (Y/N)	0.721	0.448
Number of different firms	1.849	1.250
Number of different industries	1.506	0.948
Accumulated earnings (thousands of 2000 DKK)	297.084	190.871
Accumulated net assets (thousands of 2000 DKK)	133.094	1,254.403
Number of students	204,403	

Notes. All variables are measured at the time of exiting college, unless otherwise specified.

Table 2.2: **Determinants of student employment**

DV: Experience gained at year t	β	s.e.
Current regional unemployment rate	−0.002***	(0.000)
Currently living with parents	−0.004***	(0.001)
Year $\geq$ 1996 (0/1)	0.019***	(0.001)
Age at first enrollment	0.005***	(0.000)
Female	0.010***	(0.001)
Currently has children (Y/N)	−0.026***	(0.004)
Female*Children	−0.078***	(0.002)
High-school GPA	−0.032***	(0.001)
Work experience prior to enrollment	0.007***	(0.000)
Current field: Pedagogy	0.022***	(0.001)
Current field: Health	0.018***	(0.001)
Current field: STEM	−0.030***	(0.001)
Current field: Business/Economics	0.020***	(0.001)
At least one parent with tertiary education by year t	−0.024***	(0.001)
At least one parent with entrepreneurship experience by year t	−0.005***	(0.001)
Log of parental income at current year	0.006***	(0.000)
Log of parental assets at current year	−0.001***	(0.000)
Current region: Central Denmark	0.002	(0.001)
Current region: Southern Denmark	0.003**	(0.002)
Current region: Capital	0.046***	(0.001)
Current region: Zealand	0.033***	(0.002)
2^{nd} study year	−0.053***	(0.001)
3^{rd} study year	−0.049***	(0.001)
4^{th} study year	−0.022***	(0.001)
5^{th} study year	−0.010***	(0.001)
6^{th} study year	0.001	(0.001)
7^{th} study year	0.024***	(0.002)
8^{th} study year	0.066***	(0.003)
9^{th} study year	0.121***	(0.004)
10^{th} study year	0.146***	(0.008)
First enrollment year dummies	Yes	
Number of students	204,043	
Number of observations	896,211	

Notes. Estimates obtained from panel OLS regressions. Base categories are Field: IT & Communications; Region: North Denmark; and 1st study year. Standard errors clustered at the individual level reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2.3: **Effects of student employment on entrepreneurial entry within 3 years after exiting college**

	OLS	IV: Regional unempl. rates	IV: Lived with parents	IV: Enrollment year $\geq$ 1996	IV: All
Panel A: Controls not included					
Accumulated experience via student employment	−0.002***	0.051***	−0.007***	0.088***	0.001
	(0.000)	(0.006)	(0.002)	(0.010)	(0.002)
Test of excluded instruments		700.829**	5,402.759***	277.096***	1,950.708***
Endogeneity test		85.509***	4.214**	129.702***	0.577
Overidentification test					138.531***
Panel B: Controls included					
Accumulated experience via student employment	−0.002***	0.077***	0.098***	0.068***	0.075***
	(0.000)	(0.008)	(0.026)	(0.007)	(0.007)
Test of excluded instruments		518.205***	74.072***	471.222***	212.766***
Endogeneity test		120.538***	18.437***	113.894***	149.266***
Overidentification test					3.750
Number of students	204,043	204,043	204,043	204,043	204,043

Notes. Instrumental variable regressions performed through two-stage least squares estimations. Controls correspond to the regressors included in the first-stage estimations (see table A.1 in the appendix). Tests of excluded instruments report the LM Kleibergen-Paap rk Wald F statistic. Endogeneity tests correspond to the C (GMM distance) test. Overidentification tests are based on the Hansen J statistic. All tests are robust to heteroscedasticity. See Baum et al. (2007) for further details on such tests. Robust standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2.4: **Robustness test: Endogenous treatment effects**

DV: Entrepreneurship within 3 years after exiting college	ATE (1)	ATET (2)
Treatment: Student employment (0/1)	0.016***	0.013***
	(0.003)	(0.001)
Potential-outcome means	0.003***	0.001
	(0.001)	(0.001)
Endogeneity test	21.700***	
Number of students	202,770	

Notes. Selection into treatment is modeled based on the determinants shown in table 2.2, and the outcome equation includes the same controls as the instrumental variable regressions (see table 2.3). Treatment and outcome equations are estimated through probit regressions. Robust standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2.5: **Firm size and diversity of student employment, and entrepreneurial entry**

	OLS (1)	IV: All (2)	OLS (3)	IV: All (4)
Panel A: The role of firm size of student employment				
Log of average firm size	−0.002***	−0.045***		
	(0.000)	(0.006)		
Large only / Small only (0/1)			0.012***	0.325***
			(0.001)	(0.067)
Test of excluded instruments		55.833***		18.980***
Endogeneity test		99.632***		49.554***
Overidentification test		0.440		2.372
Number of students	137,017	137,017	122,390	122,390
Panel B: The role of firm and industry diversity of student employment				
Experience in more than 1 firm (0/1)	0.001	0.060***		
	(0.001)	(0.006)		
Experience in more than 1 industry (0/1)			0.001**	0.066***
			(0.001)	(0.007)
Test of excluded instruments		820.679***		609.335***
Endogeneity test		114.630***		90.402***
Overidentification test		2.057		0.507
Number of students	178,782	178,782	178,782	178,782

Notes. All students in these subsamples worked while enrolled. Controls and tests as in table 2.3. Robust standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

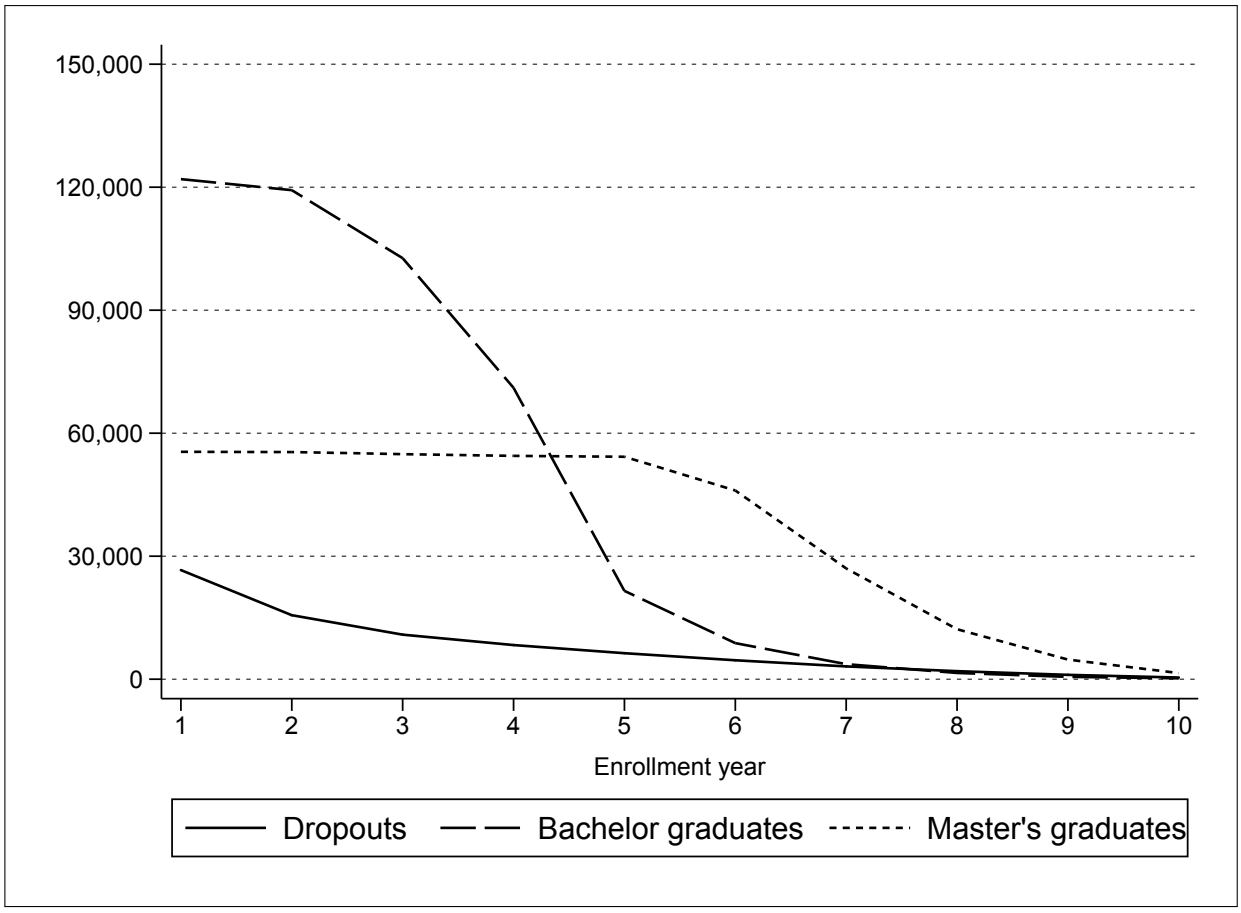

Figure 2.1: **Number of students by year of enrollment and type of college exit**

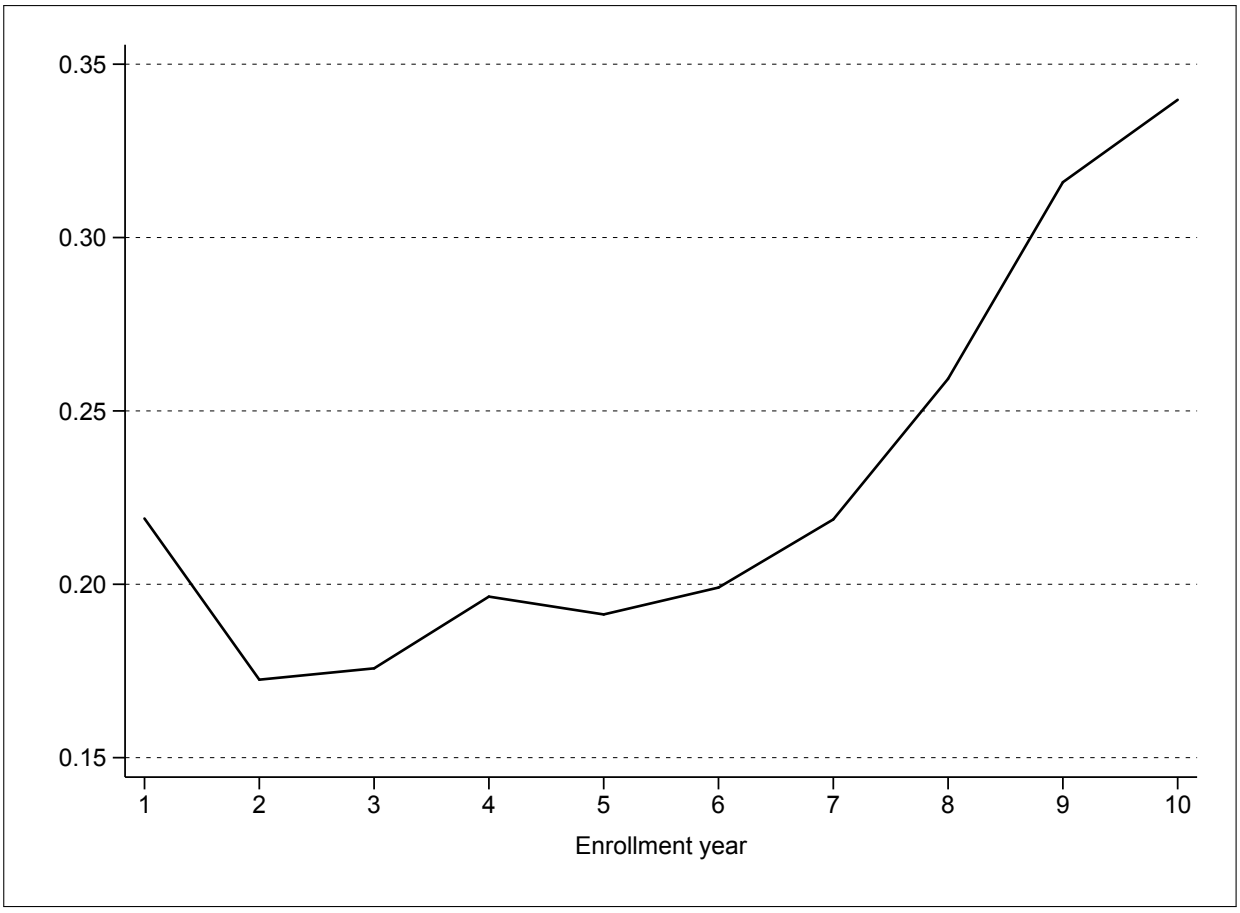

Figure 2.2: **Experience rates by year of enrollment**

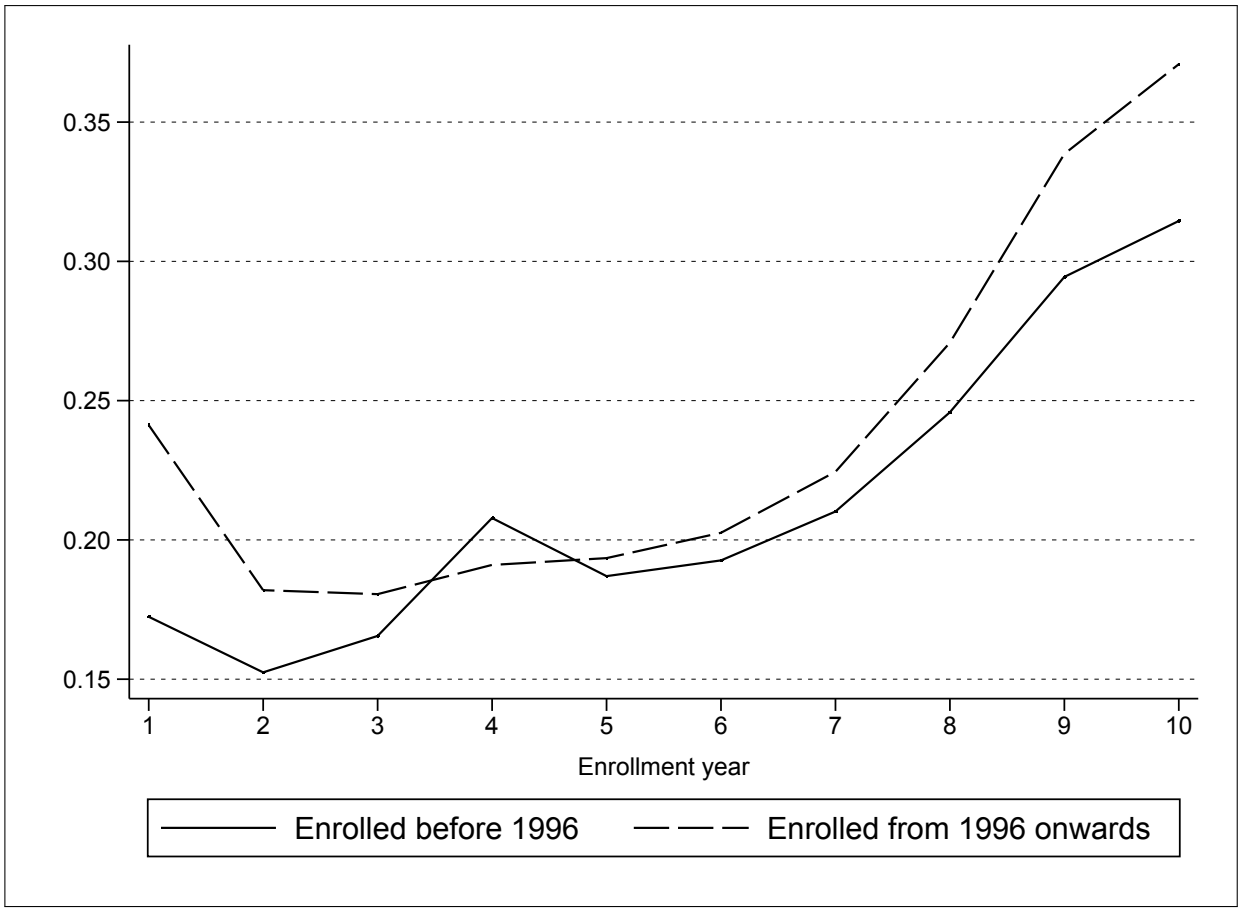

Figure 2.3: **Experience rates by year of enrollment and cohort (pre- and post-1996)**

Appendix A

Table A.1: **First-stage estimates of entrepreneurial entry within 3 years after college**

DV: Accumulated experience through student employment	β	s.e.
Average regional unemployment rate while enrolled	−0.013***	(0.001)
Share of enrollment period living with parents	−0.049***	(0.006)
Enrollment Year $\geq$ 1996 (0/1)	0.058***	(0.006)
Unemployed during first year after exiting college	−0.268***	(0.008)
Average regional unemployment rate, first 3 years after college	0.007***	(0.001)
Age	0.013***	(0.002)
Female	0.023***	(0.004)
Children	−0.001	(0.015)
Female*Children	−0.285***	(0.008)
High-school GPA	−0.081***	(0.003)
Work experience prior to enrollment	0.024***	(0.001)
Field: Pedagogy	0.065***	(0.006)
Field: Health	0.073***	(0.007)
Field: STEM	−0.090***	(0.006)
Field: Business/Economics	0.172***	(0.006)
Type of exit: Bachelor's graduate	−0.043***	(0.007)
Type of exit: Master's graduate	−0.422***	(0.010)
Log of own net assets	0.005***	(0.001)
At least one parent with tertiary education	−0.087***	(0.003)
At least one parent with entrepreneurship experience	−0.010***	(0.003)
Log of parental income	0.006***	(0.001)
Log of parental net assets	−0.004***	(0.000)
Region: Central Denmark	−0.048***	(0.006)
Region: Southern Denmark	−0.029***	(0.007)
Region: Capital	0.173***	(0.006)
Region: Zealand	0.120***	(0.008)
Constant	0.162***	(0.048)
Enrollment duration dummies (years)	Yes	
Number of students	204,043	

Notes. Robust standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Chapter 3

It's About Time: Timing of Entrepreneurial Experience and Career Dynamics of University Graduates

Adrian L. Merida
Department of Strategy and Innovation
Copenhagen Business School

Vera Rocha
Department of Strategy and Innovation
Copenhagen Business School

3.1 Introduction

While decades of research have treated entrepreneurship as a destination (i.e., an end-state), the most recent debates rather encourage adopting a career perspective, by taking entrepreneurship as a step along a career path, a bridge between different career opportunities (Burton et al. 2016). This approach not only opens a number of new research questions, but also challenges some of the seminal results in the field, such as whether entrepreneurship pays (Hamilton 2000), and whether entrepreneurial experience is rewarded in the labor market (e.g. Kaiser and Malchow-Møller 2011). For long time, entrepreneurship was consistently documented to provide lower and riskier earnings, besides yielding potential wage penalties in subsequent wage employment, often due to human capital depreciation or stigma of failure (e.g. Baptista et al. 2012; Bruce and Schuetze 2004; Hyytinen and Rouvinen 2008; Moskowitz and Vissing-Jørgensen 2002). In contrast, most recent contributions highlight the need for longitudinal analyses accounting for an individual's overall career dynamics, thereby embracing a lifecycle approach to entrepreneurship (e.g. Dillon and Stanton 2017; Humburg and Van der Velden 2015). In this vein, entrepreneurship experience—even if short (Manso 2016)—by being reversible and used as a learning stage, has been found to increase lifetime earnings (see also Daly 2015; Luzzi and Sasson 2016).

This paper contributes to this discussion and adds a new layer to the debate on whether entrepreneurship experience pays by taking into consideration *when* individuals enter entrepreneurship over their careers—namely, as a first occupational choice, or later, after a period in wage employment. There are considerable trade-offs involved in the choice of entering entrepreneurship in the beginning of one's career or later (Dillon and Stanton 2017; Vereshchagina and Hopenhayn 2009). On the one hand, an early entry allows the entrepreneur to collect potential benefits for a longer time period. On the other hand, rushing a business idea may lower the chances of finding success, for example due to a lack of human capital, resources, networks and knowledge about the market. In this context, we investigate to what extent the timing of entrepreneurial experience leads to differences in earnings and career paths.

In addition, we extend our analysis beyond the individual-level by also investigating the implications for the ventures started at different stages in one's career. Thus, we also contribute to the literature focused on the role of founder's characteristics and human capital for business performance (e.g. Bates 1990; Colombo and Grilli 2005; Dencker et al. 2008). This comprehen-

sive analysis of the consequences of entry timing for both individuals and their ventures helps us identify the mechanisms through which entrepreneurship spells influence lifetime earnings. Using entrepreneurial spells as an experimentation stage (Chatterji et al. 2016; Manso 2016), through which individuals can derive learning and accumulate more balanced capabilities (Lazear 2004; Luzzi and Sasson 2016), are among the key theoretical mechanisms for which we find empirical support. Nevertheless, entry timing might shape both the risks and rewards of an entrepreneurial endeavor (Vereshchagina and Hopenhayn 2009), and hence the scope of experimentation, learning, and human capital accumulation.

Empirically, we analyze these questions by means of detailed register data from Denmark and examine the careers of university students who are about to enter the labor market after graduating. The richness of our data allows tracking their career paths and performance during their first 15 years in the labor market. We then construct matched samples using entropy balancing methods to understand whether the implications of entrepreneurial experience depend on the timing of entry within one's career. We start by comparing the lifetime earnings of individuals with and without entrepreneurial experience, and further divide the first group into those who start their careers as entrepreneurs ("early entrepreneurs"), and those who enter the labor market as wage employees but become entrepreneurs later in their careers ("late entrepreneurs"). We furthermore compare the businesses of early and late entrepreneurs to evaluate the implications of entry timing for new venture outcomes. In supplementary analyses we explore the underlying mechanisms by accounting for the duration of the entrepreneurial spell and by comparing additional career outcomes and transitions across groups.

There are several reasons why we focus on university graduates. First, this is a sample of young and highly skilled individuals, who are believed to have high entrepreneurial and innovative potential (Levine and Rubinstein 2017). Second, university graduates arguably have better outside options, namely greater chances of finding highly paid and more stable jobs than individuals with lower education levels. The relatively higher opportunity costs of postponing or abandoning wage employment makes them, in principle, more likely to be driven by the identification of an opportunity when engaging in entrepreneurship, so the chances of observing growth-oriented and innovative ventures are higher in this sample, besides reducing the prevalence of necessity-driven entrepreneurship. Third, individuals in this sample are more homogeneous in terms of (unobserved) ability than in the full population, which allows a relatively fair comparison between individuals

with and without entrepreneurial experience. Yet, we use matching methods to alleviate further selection concerns. Finally, by focusing on the careers of university graduates once they finish their studies, we are better able to identify the moment when individuals become "at risk" of seriously entering the labor market. For individuals with lower education levels, the timing of labor market entry is not necessarily clear and may be more correlated with unobserved ability, thus making any empirical analysis more challenging.

Given these sampling choices, we also contribute to two lively debates within entrepreneurship scholarship. On the one hand, this study adds to the discussions on the imprinting effect of entry conditions for both individual careers and new ventures. Earlier studies demonstrate that initial conditions at labor market entry, such as the business cycle or the first job assignment, lead to persistent effects on individuals' earnings and career prospects (Altonji et al. 2015; Cockx and Ghirelli 2016; Kahn 2010; Oreopoulos et al. 2012; Oyer 2006, 2008). Likewise, labor market conditions at start-up foundation can have imprinting effects on entrepreneurial performance (Kwon and Ruef 2017). By looking at the implications of individual occupational choice (entrepreneurship or wage employment) at the outset of their careers, our study relates closely to such debates on imprinting effects. On the other hand, this paper also relates to the policy discussion on whether promoting entrepreneurship in schools and universities is recommended (Elert et al. 2015). Policy makers often regard entrepreneurship as a source of growth and innovation, and therefore several universities around the world now offer a variety of entrepreneurship education programs. Yet, earlier evidence (for a review, see Martin et al. 2013) suggests that some of the intervention programs targeting university students have often failed to either incentivize entrepreneurial intentions among young individuals (e.g. Oosterbeek et al. 2010) or to improve their future performance (e.g. Fairlie et al. 2015). Even though we do not evaluate the effectiveness of any policy intervention, our analysis of the timing of entrepreneurial entry and subsequent career dynamics of young graduates can expand our understanding of the potential risks and/or rewards of entrepreneurship endeavors in early stages of one's career, and indirectly contribute to the aforementioned policy discussion.

We confirm the most recent findings suggesting that entrepreneurial experience yields positive returns in terms of lifetime earnings (Daly 2015; Luzzi and Sasson 2016; Manso 2016). Yet, in line with our theory, we show that the timing of the first entrepreneurial transition is not innocuous: early entrepreneurs exhibit a short-term penalty compared to never entrepreneurs, but catch-up and perform even better in the long run; whereas entering entrepreneurship later, after

some experience in wage employment, reduces short-term losses and yields greater earnings in the long run, besides improving business performance. Further differences across groups reveal that individuals use entrepreneurship as an (often short) experimentation stage, although with different learning purposes depending on the timing of the entrepreneurial entry: early entrants experiment and learn about their own preference for and fit to entrepreneurship, whereas late entrants seek to put their ideas into practice but had already developed a preference for this type of occupation.

The remainder of this paper is structured as follows. In section 3.2, we build on the evolving research on the returns to entrepreneurial experience and develop our hypotheses regarding the role of timing of entrepreneurial entry. The data and methods used to test such theoretical propositions are described in sections 3.3 and 3.4, respectively. Section 3.5 presents and discusses the main results, while section 3.6 presents extended analyses to explore the potential mechanisms underlying the results. Finally, section 3.7 provides a final discussion and concludes the paper.

3.2 The Timing of Entrepreneurial Entry and Career Dynamics: Background and Hypotheses

The lifecycle and career perspectives of entrepreneurship (Aldrich and Kim 2007; Burton et al. 2016) recognize that individuals may enter or exit start-up activity multiple times throughout their careers, so there may be distinct career paths triggered by different circumstances and/or preferences, which lead individuals into episodes of entrepreneurship (Kwon and Ruef 2017). Therefore, most recent scholarship recommends analyzing transitions to entrepreneurship as a form of career mobility (Frederiksen et al. 2016; Sørensen and Sharkey 2014), which is likely to impact the trajectory of individual performance.

By embracing these approaches, recent studies have started questioning earlier findings on the returns to entrepreneurship. The literature had traditionally found that entrepreneurship yields smaller and more volatile earnings than wage employment (Bruce and Schuetze 2004; Evans and Leighton 1989; Hamilton 2000; Hyytinen and Rouvinen 2008; Moskowitz and Vissing-Jørgensen 2002; Williams 2000).[1] The median business owner was documented to earn about 35 percent less than the estimated wage had she been paid employed (Hamilton 2000), and unconditional

[1] Some studies have however found particular conditions that could alleviate the earnings penalty associated with entrepreneurship experience, such as returning to wage employment in the same industry after a successful entrepreneurial experience (Kaiser and Malchow-Møller 2011), or entering a managerial position, thereby climbing the job ladder faster than individuals with no experience in entrepreneurship (Baptista et al. 2012)

comparisons of the earnings distributions regularly confirmed that entrepreneurial earnings are often more skewed and dispersed, owing to the existence of very few "stars" (i.e., highly successful entrepreneurs) and many "misfits" (individuals earning far less than they would in wage employment) (see, for instance, Åstebro and Chen 2014). While self-selection based on unobserved attributes—such as taste for variety, different degrees of risk and loss aversion (Hvide and Panos 2014; Koudstaal et al. 2015), willingness to accept uncertainty in economic decisions (Holm et al. 2013), overconfidence (Hayward et al. 2006), or overoptimism (Dushnitsky 2010; Lowe and Ziedonis 2006)—could contribute to explain this so-called "earnings puzzle", non-pecuniary benefits—such as being "your own boss", having a more flexible schedule, autonomy to make decisions, and an overall greater job satisfaction—are more often claimed to be the main explanation for many to choose (and stay in) self-employment, despite the apparently lower earnings (Benz and Frey 2008a, 2008b; Blanchflower and Oswald 1998; Hamilton 2000; Hurst and Pugsley 2011).

However, these prevailing insights of negative pecuniary returns from entrepreneurship have been gradually amended based on a variety of arguments. First, income comparisons involving entrepreneurs are complex due to the tendency for self-employed individuals to under-report their income (Åstebro and Chen 2014; Hurst et al. 2014).[2] Second, the lack of consensus of what constitutes an entrepreneur introduces further complexity, given the high degree of heterogeneity among business owners, often ranging from self-employed individuals with no employees and no innovative business to incorporated businesses hiring labor and exhibiting high growth ambitions (Levine and Rubinstein 2017; Sorgner et al. 2014). Third, but not less important, cross-sectional comparisons of wages and entrepreneurial earnings have been deemed inadequate to study entrepreneurship from a lifecycle and career perspective, by neglecting a variety of biases that can result in wrong estimations of the true mean and variance of entrepreneurial earnings (Manso 2016).[3]

Recent scholarship focused on the lifetime earnings of individuals with and without entrepreneurial experience, and addressing most of those concerns, actually find that trying entrepreneurship—even if shortly—might pay off. Using a representative sample of the U.S. population, Daly (2015)

[2] Both Levine and Rubinstein (2017) and Sorgner et al. (2014) find that, compared to employees, employers or incorporated self-employed earn more, while solo (or unincorporated) entrepreneurs earn less, on average.

[3] Following Manso (2016), we acknowledge the following potential sources of bias in our empirical design. First, when pooling earnings from entrepreneurship, ventures that survive for longer periods are overweighted (survivorship bias). Second, cross sectional comparisons implicitly assume that entrepreneurship is an irreversible choice, thus neglecting the possibility that unsuccessful entrepreneurs will not insist with a non-promising business idea and may decide to switch to wage employment or to engage in serial entrepreneurship with a different business (experimentation bias). Finally, cross-sectional analyses do not consider the fact that wages for employees may be affected by their past entrepreneurial experience, thus attributing to wage employment a potential premium derived from a history of entrepreneurship (attribution bias).

finds that those who attempted self-employment tend to earn more during the following 15 years, although in most cases the effect seems to be driven by the top of the distribution. Likewise, Luzzi and Sasson (2016) find positive rewards (at the mean and median) from entrepreneurship in subsequent wage employment in Norway, with no median discounts for entrepreneurs exiting low performing firms. Humburg and Van der Velden (2015) echoes these findings for the Swedish population, similar to Dillon and Stanton (2017) for the U.S., though for some portions of the population (around 15% of their sample) non-pecuniary benefits might still be more significant than pecuniary rewards. Campbell (2013) shifts the focus to individuals with employment experience in start-ups—i.e., joiners, rather than founders—and finds comparable rewards for those having those episodes in their career.

The possible mechanisms underlying those rewards from entrepreneurship seem to be multiple and not necessarily mutually exclusive. First, entrepreneurship might endow individuals with a more diverse and balanced skill set (Campbell 2013; Lazear 2004, 2005), and thereby a comparative advantage in subsequent jobs, especially in decision making and managerial positions (Baptista et al. 2012; Custódio et al. 2013). As a result, entrepreneurial experience may provide valuable, rare, and inimitable resources and capabilities (Alvarez and Busenitz 2001), and hence signals about individual unobserved quality (Luzzi and Sasson 2016), although often dependent on the success of their earlier trials as business owners.[4] To the extent that those skills and resources are transferable outside entrepreneurship and valuable in another firm, positive and significant rewards from that experience might be expected.

Second, trying entrepreneurship at some point of an individual's career might allow taking risks, experimenting, and learning about their fitness for alternative employment (Chatterji et al. 2016; Kerr et al. 2014; Manso 2016). In an entrepreneurial setting, where the benefits of pursuing different strategies are not clear and the costs of testing their validity are often high, each individual endeavor is a process of experimentation that provides continuous information about the likelihood of ultimate success, thus allowing the entrepreneur to decide whether to continue or abandon the current venture (Dimov 2010). Indeed, a key part of this experimentation process is to be tolerant to failure and able to terminate unsuccessful projects (Arora and Nandkumar 2011; Kerr et al. 2014), which, when done timely, might not penalize earnings in subsequent employment

[4] Alternative explanations could be provided by "stars" and "misfits" theories (Åstebro and Chen 2014; Rosen 1981) especially when the returns (penalties) to entrepreneurship are mostly observed at the top (bottom) of the earnings distribution. It is therefore important to empirically distinguish the possible "treatment effect" of entrepreneurship from pure selection effects.

(Luzzi and Sasson 2016; Manso 2016), besides providing information about individual quality and that of her ideas, being thus a crucial stage of self-learning (Chatterji et al. 2016).

Based on these theoretical arguments, we expect young skilled individuals—a sample where labor market misfits and necessity-driven entrepreneurship are expected to be less prevalent than in the broader population—to benefit, on average, from trying entrepreneurship at some point in their careers. Formally:

Hypothesis 1: *Individuals with entrepreneurial experience in their career after graduation exhibit on average greater lifetime earnings than comparable individuals never trying entrepreneurship.*

However, the timing of entry in an entrepreneurial occupation is likely to matter. The beginning of a person's career is an especially sensitive juncture, with likely imprinting effects on subsequent career paths and outcomes (Altonji et al. 2015; Cockx and Ghirelli 2016; Kahn 2010; Oreopoulos et al. 2012; Oyer 2006, 2008). Entering entrepreneurship in particular further represents a transition into a new professional identity, requiring adjustments to novel skills (Hoang and Gimeno 2010). On the one hand, human capital theory (Becker 1993) emphasizes the importance of early investments in competences and skills, by allowing individuals to reap the benefits over a long period of time. In this regard, trying entrepreneurship in early stages of one's career could maximize the time horizon through which an individual could reap the returns of investing in diverse and balanced skills (Lazear 2004, 2005), conditional on those being demanded and valued by subsequent employers. On the other hand, starting a business without any experience in the labor market can imply resource scarcity and lower ability to pivot if needed (Vereshchagina and Hopenhayn 2009), and consequently a greater risk of abandoning the founder role (Hoang and Gimeno 2010) with possibly more limited chances of acquiring valuable skills from entrepreneurship.

Vereshchagina and Hopenhayn (2009) are among the few acknowledging, theoretically, that entry timing might matter in entrepreneurship, though we still lack explicit empirical evidence documenting its consequences.[5] Building on their dynamic occupational choice model, we reiterate that individuals choosing to enter wage employment in the beginning of their careers and accumulating wealth to eventually switch to entrepreneurship in the future face a trade-off between a) entering soon and investing in a possibly risky, but also promising, project, and b) accumulating

[5] To the best of our knowledge, only the study by Dillon and Stanton (2017) provides empirical evidence on this matter. Our analysis differs from theirs in three ways. First, we explicitly test the effects of choosing entrepreneurship as the first full-time occupation when starting a career. Second, they base their estimations on a sample of a full population, whereas we focus on university graduates to reduce bias from unobserved heterogeneity. Finally, we rely on population data rather than simulations to observe differences in earnings.

more resources and entering later to avoid this risk. On the one hand, entering early might enable reaping profits from a successful entrepreneurial venture for a longer period of time (Dillon and Stanton 2017), while keeping the chance of switching to wage employment in the future in case of failure (Arora and Nandkumar 2011; Manso 2016). On the other hand, being more patient might imply delaying entry and shortening the reaping period, but may also increase the chance of guaranteeing success and remaining in entrepreneurship, owing to the financial, social, and human capital accumulated in previous jobs (Cassar 2014; Colombo and Grilli 2005; Delmar and Shane 2006).

Furthermore, with experience in wage employment, workers accumulate both match-specific training through learning by doing and crucial information that allows them infer the quality of the match with the current employer (Chatterji et al. 2016). Nagypál (2007) finds learning by doing to be present during the first months of an employment relationship, and learning about match quality to dominate at longer tenures, with both effects usually shielding employees from adverse shocks and creating lower incentives to leave. Consequently, the timing of entering entrepreneurship might indicate how plentiful outside employment opportunities are. Early entrepreneurs may therefore face lower opportunity costs than individuals starting their careers as wage employees and considering switching to entrepreneurship later. This implies that individuals entering entrepreneurship later, after some episode(s) of wage employment, might be more committed to entrepreneurship and possibly driven by more promising market opportunities—which they may have identified while working for their previous employers (Elfenbein et al. 2010; Sørensen and Fassiotto 2011)—than early entrepreneurs with no work experience. Alternatively, later entrants might also be more impatient for success, and thus close down or cash-out faster (Arora and Nandkumar 2011), to possibly start another business with better prospects or return to wage employment where they might obtain relatively greater returns. We thus derive that:

Hypothesis 2: *Individuals trying an entrepreneurial spell later, after some experience in wage employment, exhibit greater lifetime earnings than otherwise comparable individuals trying an entrepreneurial career spell early, right after graduation.*

Finally, Kwon and Ruef (2017) reiterate previous studies showing that starting a business in adverse economic conditions might impose a penalty on entrepreneurial earnings that can persist for up to a decade. As mentioned above, late entrepreneurs might have a higher opportunity

cost—their current job, and the associated earnings, (possibly specific) skills, and status—in the decision to switch to entrepreneurship (Cassar 2014; Coleman 1988), and might therefore become more demanding in terms of the expected profitability of their potential ventures and more committed once they have decided to make the transition. Moreover, they may also benefit from their previous employer's networks of suppliers and customers, particularly if they were employed in entrepreneurial environments such as small and young firms (Campbell 2013; Gompers et al. 2005; Sørensen 2007a). Hence, we posit that starting a business without labor market experience can be another representation of adverse initial founding conditions, given the relative disadvantage in terms of human, social, and financial capital, compared to individuals with some experience in wage employment.

Hypothesis 3: *New ventures founded by individuals entering entrepreneurship later, after some experience in wage employment, exhibit greater performance than those founded by comparable individuals entering entrepreneurship early, right after graduation.*

We next describe the data and methods used to test these theoretical hypotheses, followed by the discussion of the results and supplementary analyses aiming at identifying the key underlying mechanisms explaining the rewards from entrepreneurial experience, and the heterogeneities among earlier and later entrants in entrepreneurship.

3.3 Data

In our analysis, we make use of the "Integrated Database for Labor Market Research" (also known by the acronym IDA) combined with the Education registers (UDDA) to estimate the effects on lifetime earnings of choosing entrepreneurship as the main occupation at the time of first entry into the labor market. The IDA dataset is a matched employer-employee database maintained by Statistics Denmark that compiles data based on register information of the Danish population. The structure of the dataset allows tracking individuals and their employment status together with numerous variables that include information on characteristics of the individuals in terms of demographics, parental information, labor market outcomes, and personal income.

In our analysis we focus on graduates from tertiary education—further controlling for differences between graduate and postgraduate students—who are about to enter the labor market, and we track them during the first 15 years after graduation. We then distinguish between (i)

graduates who start their careers as entrepreneurs, (ii) graduates who start as wage employees but become entrepreneurs within the subsequent 14 years, and (iii) graduates who start as employees and never become entrepreneurs.

We identified first time transitions into the labor market when these graduates finish their tertiary education and become registered (for the first time) either as full-time employees or full-time entrepreneurs in the dataset. In order to mitigate further concerns of necessity entrepreneurship, we only considered graduates who started their professional career in the year of graduation or the next one. Thus, we do not include in our analyses those who found a job or created a start-up after more than a full year of inactivity or unemployment, as these ones may have been pushed to poor jobs or necessity-driven self-employment.

Moreover, we restrict the sample to individuals who appear registered in the database every year during the first 15 years after graduation, to avoid further problems caused by attrition. Since our dataset covers the period 1981 to 2012, this implies that our last cohort of individuals graduated in 1998. We also dropped individuals enrolling in university at ages older than 25 or graduating at ages older than 30, in order to avoid lingering students who may gather too much work experience before graduation. Finally, we discarded individuals sorting into the primary and the public sectors at entry. These restrictions leave left us with a final sample of 107,410 individuals, out of which 1,103 (1.03%) started their career as entrepreneurs, 8,248 (7.68%) became entrepreneurs later within the subsequent 14 years after entering the labor market as wage employees, and 98,059 (91.29%) never became entrepreneurs during the period covered.

At first glance the number of individuals who choose to become entrepreneurs right after graduation is remarkably low. In relative terms, they account for just 1.03% of the total number of graduates entering the labor market in our sample. While this rate may seem rather low, it is consistent with previous studies focusing on entrepreneurial intentions among university graduates. A recent study by Larsson et al. (2017) offers the closest comparison to our sample, as it considered the entire population of graduates from Sweden. In their study, they showed that only 2.69% of Swedish university graduates entered entrepreneurship within the first three years upon graduation (the comparable percentage in our sample is 2.43%). Similarly, Bergmann et al. (2016) collected data from 61 universities across Europe and found that only 1.6% of all graduates from business and economics studies actually started a company. In the U.S., where entrepreneurship is still a more common phenomenon than in Europe, Åstebro et al. (2012) found that the proportion

of graduate students becoming entrepreneurs within three years after graduation is just below 6%. Even among MBA students at Harvard Business School, the rate of individuals becoming entrepreneurs upon graduation is typically below 4% (Lerner and Malmendier 2013). In short, entrepreneurship upon graduation is a rare event.

We computed lifetime earnings as the average yearly earnings that each individual had over different time horizons.[6] To be more specific, we calculated an approximation of "lifetime" earnings, since we had to restrict our analysis to the first 15 years of their professional careers. In order to observe the earning dynamics in the short-, medium-, and long-terms, as well as the bigger picture of the entire period, we examined their average (discounted) annual earnings during the years 1 to 5 (first five years in the labor market), years 6 to 10, years 11 to 15, and the entire period (years 1 to 15).

3.4 Methodology

The main objective of our analysis is to compare the earnings of university graduates depending on whether and when they become entrepreneurs. Early, late, and never entrepreneurs are likely to differ systematically in a wide range of characteristics, and ignoring the fact that the distributions of their observable characteristics are dissimilar would lead to biased estimations of the effect of entrepreneurial experience on lifetime earnings—the average treatment effect on the treated (ATT). Thus, a key part of our analysis is to generate comparable samples.

To that end, we match individuals through *entropy balancing (EB)*, a recently developed matching algorithm developed by Hainmueller 2012.[7] One of the main advantages that EB has over other alternative matching techniques is that it avoids the necessity of having to "manually" find an appropriate weighting—in the sense that with other techniques one needs to keep changing the specification until a suitable balance is found. Instead, EB allows the researcher to impose a set of balance constraints such that perfect balance is found in the mean, the variance, and even the skewness of all covariates. Then, EB automatically assigns weights to find balanced samples in

[6] Our earnings variable captures the following components of individuals' personal income: (i) net labor earnings (wages and profits from self-employment), (ii) transfer income, (iii) property income, and (iv) other non-classifiable income attributable directly to the individual. When computing lifetime earnings, we first adjusted the income variable for inflation through the Consumer Price Index (CPI). All monetary values in this paper are expressed in thousands of Danish kroner (deflated, prices of year 2000). Robustness checks using only net earnings from labor activities yielded similar results and are available from the authors upon request.

[7] The implementation of this matching procedure is based on the **ebalance** command in Stata, further described in Hainmueller and Xu (2013).

terms of all covariates, subject to the conditions imposed with respect to the first, second, and third moments. This also implies that balance checking is not required. In fact, traditional matching techniques often provide less satisfactory levels of covariate balance.

Another advantage of EB is that the assigned weights are continuous, instead of being dichotomous as in other methods—such as nearest neighbor matching. This flexible reweighting allows keeping as much information and as many observations as possible, besides achieving high levels of covariate balance. In our analysis, this last feature of entropy balancing made it preferable over alternatives such as Coarsened Exact Matching or Propensity Score Matching, since the relatively small treatment group of early entrepreneurs made it difficult to achieve balance.

Thanks to the richness of our data we were able to match on a wide range of characteristics, including demographics, level and field of education, parental background, and industry of entry. It is well known that personal characteristics such as gender, marital status, household conditions, or location can influence the decision of becoming an entrepreneur (e.g. Blanchflower and Oswald 1998). We therefore match individuals based on a broad set of demographics measured at the time of graduation, including their age, gender, and whether they live in the capital, are married, have kids, and live with their parents. Entrepreneurs are likely to come from the tails of the ability distribution (Åstebro et al. 2011; Elfenbein et al. 2010), which could also affect the outcomes of interest. In order to minimize the effect of such unobserved ability, we include their high-school Grade Point Average (GPA) in the matching algorithm. Net individual assets at the time of entry are also included in the matching, since financial barriers may explain the (non-)entrepreneurial intentions of young individuals (Hincapié 2017), besides being possibly correlated with unobserved ability.

Individuals are also matched in terms of accumulated experience by the time they graduate. In Denmark, it is rather common that students take a gap year between high-school and university studies, which they may use to work either in the country or abroad. Moreover, although our restrictions in terms of enrollment and graduation ages ensures that we do not include individuals who delay their graduation excessively, many of these students may have worked in part-time or summer jobs during their tertiary studies. Hence, including this variable in the matching procedure is paramount to capture potential differences coming from past work experiences, minimal though they might be. Additionally, we matched individuals based on their achievements during their tertiary education. More precisely, we included their field of study—as entrepreneurship may be

more prevalent in some fields (e.g. business) than in others (e.g. pedagogy)—, as well as the number of years they spent at university and whether they completed any postgraduate degree.

Besides personal characteristics, the literature has often emphasized the influence of parents on the offspring's entrepreneurial behavior (Lindquist et al. 2018; Nicolaou et al. 2008; Sørensen 2007b). Therefore, we extend our matching algorithm by adding parental income and assets, as well as dummy variables for whether any of the parents had completed tertiary education, and whether any of the parents was ever an entrepreneur by the time the focal individual graduates. Finally, we included the industry which they sort into when they enter the labor market.

Table 3.1 provides a detailed listing of the variables included in the matching algorithm. Although our matching procedure does not fully solve the potential influence of unobserved heterogeneity, we are confident that our comprehensive set of matching covariates captures most unobserved characteristics such as ability, individual preferences, possible exposure to entrepreneurial role models via their parents, and intergenerational transfers of knowledge and other resources, such as financial and social capital. [8]

3.5 Results

3.5.1 Timing of Entrepreneurial Entry

Before testing the validity of our hypotheses, we first describe the graduates in our sample according to their choice for an entrepreneurial career and timing of entry. Table 3.1 provides basic descriptive statistics for the three groups under analysis (never, early, and late entrepreneurs). The first rows briefly summarize their average earnings and are suggestive of an earnings premium for those who have had any experience as entrepreneurs after graduation. Furthermore, the timing of entrepreneurial entry seems to matter, since later entrepreneurs tend to exhibit greater earnings in general, as theoretically anticipated.

Yet, graduates entering entrepreneurship differ from never entrepreneurs in several characteristics, as do individuals trying an entrepreneurial spell in different moments of their career. Early entrepreneurs are, for instance, more often men living in the country capital with significantly

[8] Table B.3 in the appendix shows that our EB procedure yielded virtually identical treatment and control groups in terms of the mean, variance, and skewness of all matching covariates. Because EB only allows binary treatment variables, we performed specific matchings for each comparison (e.g., never vs. ever entrepreneurs; never vs. early entrepreneurs; early vs. late entrepreneurs). We report the covariate balance for the comparison of ever and never entrepreneurs for illustration, but details on the matching quality for the other comparisons are available upon request.

greater net assets by the time of graduation—both personally and via their parents. Differences between later and never entrepreneurs in those dimensions are also visible, though less pronounced. The groups are also likely to differ in their ability and skills, given the slight differences in their average high-school GPA (see Figure B.1 in the appendix), their time spent at university, and the completion of post-graduate studies, but especially their dissimilar distribution across fields of study and first industry of entry in the labor market (as entrepreneurs or wage employees). More specifically, early entrepreneurs are over-represented in STEM and business fields, as are late entrepreneurs to a lesser extent, whereas never entrepreneurs are more dominant in health and pedagogy. Moreover, early entrepreneurs tend to disproportionately sort into knowledge-intensive services when entering the labor market, whereas late and never entrepreneurs also dominate the health and education industries. These differences might also contribute for their different trajectories in the labor market over time, as evidenced by a greater propensity to change jobs (measured as employer changes) or industries among those who have had entrepreneurial experience.

Table 3.2 provides further evidence on the differences between the three groups, by reporting the estimates of a multinomial logit model for the timing of entry. The analysis is complemented by an accelerated failure time model for the time to first entrepreneurial experience (column 4). Both models confirm that male graduates living in the capital area are more likely to enter entrepreneurship, and to make the transition earlier in their careers. Family circumstances are confirmed to play a role in the timing of entry, which seems to be postponed by single individuals living with parents, but also by the number of children in the family. All these conditions may indicate lack of financial stability or unfavorable family circumstances to founding. We also observe that individual ability—proxied by higher school GPAs and postgraduate education—makes individuals more prone to try entrepreneurship, though not immediately after graduation, but in a later stage, after some employment experience. Finally, parents' human and financial capital seem to be associated with young graduates' entrepreneurial entry either in earlier or later stages, though their net assets might provide them with a financial cushion that accelerates their entry. Graphs of the Nelson-Aalen cumulative hazard estimates for entrepreneurial entry for illustrative groups are shown in Figure B.2 in the appendix as a complement to these estimations.

Given these considerable differences across groups, it is crucial to test whether the earnings gaps identified in the initial statistics remain valid once we account for all these sources of heterogeneity. We have therefore constructed matched samples based on the variables in Table 3.2,

besides controlling for a number of remaining differences across groups (e.g. their dissimilar labor market dynamics) when estimating the effect of entrepreneurial experience on individual earnings and entrepreneurial performance measures. This approach gives us confidence in our measurement of the effect of entrepreneurial experience, while excluding (or at least minimizing the influence of) confounding explanations, such as unobserved ability or behavioral traits that could be systematically different across the three groups under analysis. The results of these analyses are now reported and discussed.

3.5.2 Returns to Entrepreneurial Experience

Table 3.3 estimates the earnings differential between ever and comparable never entrepreneurs. In our sample, 8.7% of the graduates became entrepreneurs at some point during their first 15 years in the labor market. Four rows and four columns are displayed in this table: the first row exhibits the estimates of the earnings gap between ever and never entrepreneurs during the entire 15-year period; the following rows split the time period in three different stages in order to show the evolution of the annual earnings differential. Furthermore, for each period considered, the earnings gap is estimated at the mean, the bottom quartile, the median, and the top quartile.

The results confirm a positive and significant difference in annual earnings favorable to ever entrepreneurs, as advanced by Hypothesis 1. The estimated average difference during the entire period is slightly above DKK44,000 (at the prices of year 2000) a year.[9] It corresponds to about 14.4% higher earnings relative to what they would have earned, had they never been entrepreneurs. Yet, the magnitude of the earnings gap is likely to change over time and across quartiles of income distribution. During the first five years, the average yearly gap is just above DKK7,000, and the premium increases over time. This is consistent with Daly (2015), who finds that the earnings differential is smaller in the first five years than in the following years. Earnings differentials are significant at the mean, median, and particularly pronounced at the top quartile of the income distribution. Only never entrepreneurs in the lower tail of the distribution seem better off than ever entrepreneurs. Thus, overall, we find empirical support for our first hypothesis.

We next analyze whether the timing of the first entrepreneurial transition plays a role in the earnings dynamics of young graduates. Table 3.4 provides the respective estimates for the earnings gap between early and late entrepreneurs. We find that early entrepreneurs earn less than their

[9] In August 2018, the conversion rates from Danish kroner to Euros and U.S. Dollars were €0.13417 and $0.15228, respectively. The current value of one Danish kroner of the year 2000 equated to $0.2042.

counterparts, as postulated in Hypothesis 2. More specifically, early entrepreneurs earn, on average, 8.1% less than late entrepreneurs per year during the first 15-year window after graduation. The gap is sizable and visible across all quartiles of the income distribution, particularly in the shorter-term (first five years after graduation). However, the differentials are particularly persistent and remarkable at the top of the income distribution, for whom trying entrepreneurship "too early" might result in a long-lasting penalty compared to those who have only tried entrepreneurship after some experience in wage employment.

In summary, and in line with our theory, an early transition into an entrepreneurial career, with no relevant work experience after graduate studies, is not found to pay off compared to postponing this career shift. Actually, complementary analyses comparing early entrepreneurs' earnings with those of never entrepreneurs indicate that choosing entrepreneurship as the first occupation after graduation might result in considerable penalties in the shorter-term, which are hardly reversed in the longer-term (see Table B.1 in the appendix). In contrast, more fine-grained comparisons between never entrepreneurs and those who try entrepreneurship in later stages (Table B.2 in the appendix) confirm that having a career spell in entrepreneurship has a positive effect on lifetime earnings for most: positive and highly significant returns are observed at the mean, median, and above. Figure 3.1 provides a more complete overview of the earnings dynamics of early, late, and never entrepreneurs during their first 15 years after graduation. Once more we confirm that entrepreneurial experience pays off, especially among later entrants. Early entrants eventually catch up in the long run on average, but not before a period of significantly lower earnings. Delaying entrepreneurial entry for some time might thus allow individuals to accumulate (human and/or financial) resources and thereby achieve more favorable circumstances, with no apparent loss possibly caused by waiting longer to explore a market opportunity (if available before), or having a longer time horizon to reap the pecuniary rewards from entrepreneurship experience. We next evaluate whether the timing of entry also shapes new venture success, which—if so—might contribute to resolve the trade-off between entering earlier or later.

3.5.3 Timing of Entry and Entrepreneurial Performance

In Table 3.5 (Panel A) we evaluate the difference between early and late entrepreneurs in four entrepreneurial outcomes: start-up size, entrepreneurial earnings in the start-up year, the duration (in years) of the first entrepreneurial experience, and the propensity to hire at least one

new employee in the second year of activity (conditional on surviving the first year). These are used as proxies of entrepreneurial performance. We find that early entrepreneurs were consistently outperformed by late entrepreneurs in all these measures: they start smaller firms (i.e., firms with smaller teams), they exhibit significantly lower earnings by the end of the first year of activity, they survive considerably shorter periods as entrepreneurs, and they are also slightly less likely to hire further employees in later stages.

Panel B complements this analysis by using a continuous measure for the experience in wage employment before entrepreneurial entry. We find significant and sizable impacts on both start-up size and initial entrepreneurial earnings, with one additional year in wage employment being estimated to increase start-up size by 16% and initial entrepreneurial earnings by almost DKK18,000. The relationship between the number of years in wage employment and entrepreneurial spell duration and probability of hiring at a later stage is positive but not statistically significant in these additional analyses. Nevertheless, simple descriptive statistics reveal that early entrants abandon entrepreneurship much faster than later entrants, and very often after one year (see Figure B.3 in the appendix). Overall, these tests provide empirical support for our third and final hypothesis.

3.6 Post-hoc Analyses: Underlying Mechanisms

3.6.1 Entrepreneurship as an Experimentation Stage

We now delve deeper into the previous results in order to understand the potential underlying mechanisms for the earnings differentials observed among the three groups of graduates. First, we investigate how the duration of the career spell in entrepreneurship relates to earnings dynamics. Given that most ever entrepreneurs leave this occupation after one year (cf. Figure B.3 in the appendix), we test the effect of trying entrepreneurship for this short period.

Table 3.6 shows that graduates with a one-year long episode in entrepreneurship throughout their careers still tend to earn more at the mean and at the top of the distribution (Panel A). On average, we find a rough estimate of a 10.9% yearly bonus for those who spend a year as entrepreneurs—not that distant from the 14% premium identified in Table 3.3. Given that we only cover the first fifteen years after graduation and that the earnings differential seems to increase over time, this is likely a lower bound—measured at the mean—of the returns to a short entrepreneurial experience.

Interestingly, we also find positive returns—in the longer-term and at the mean—from such short experience in entrepreneurship for those trying it early, right after graduation (Panel B). This suggests that entering entrepreneurship early in one's career does not necessarily harm future earnings if used as an experimentation stage, as also suggested by Manso (2016) for a representative sample of the broader U.S. population. This early trial with entrepreneurship might allow individuals to quickly test their fit to this occupation, and/or the quality of their idea, and rapidly act upon their updated beliefs based on the new knowledge possibly acquired with this experience. In addition, such quicker experiments with entrepreneurship early in one's career seem to mitigate the penalties more often suffered by early entrants (cf. Table B.1 in the appendix).

Finally, in Panel C we test how the length of the entrepreneurial spell of ever entrepreneurs relates to their earnings. We document a non-linear, U-shaped, relationship, with an inflection point between four and five years of entrepreneurial experience based on the estimates at the mean. This hints that different types of entrepreneurial attempts might occur, with important implications on individual lifetime earnings. On the one hand, using entrepreneurship as an experimentation stage might actually be rewarding, as already suggested by Panels A and B, by allowing individuals to learn about them and their ideas relatively fast. If they learn from this experience quickly and return to wage employment, they seem to minimize the potential losses from unsuccessful founding and potentially enjoy significant premiums in the medium- and longer-term. However, this premium might vanish or even become negative if one takes "too long" to learn and abandon a non-promising entrepreneurial attempt. Multiple explanations can justify why a positive premium might still arise after such a short—and not necessarily successful—entrepreneurial experience: experimenting with a career in entrepreneurship might reveal that they are better fits in wage employment, besides possibly endowing individuals with some (balanced) skills, or signaling some unobserved traits, that might be appreciated and rewarded by subsequent employers. The validity of these additional mechanisms cannot be inferred from the current analyses, but will be further explored below.

On the other hand, entrepreneurship might turn out to be a good occupational fit and rely on a profitable market opportunity, in which case individuals establish companies that survive long and become successful. Once they overcome the so-called valley-of-death (which often corresponds to the first 3 to 5 years of most new ventures), the pecuniary rewards become more evident, especially for those at the top of the income distribution. Nevertheless, some might stay long time

in entrepreneurship without observing significant monetary rewards. For this particular group (such as those in the lower quartile of the earnings distribution), non-pecuniary benefits might be the reason why they stay in entrepreneurship (Hamilton 2000).

3.6.2 Entrepreneurship Experience and Labor Market Dynamics: Balanced Skills and Taste for Variety

In an attempt to further unveil additional explanations for the positive returns to entrepreneurial experience—even if used as a short experimentation period—we complement the previous analyses by looking at the effect of entrepreneurship (and their timing) in subsequent labor market outcomes. Table 3.7 shows the effect of entrepreneurship experience on the number of job (i.e., employer) changes, the number of 1-digit industry changes, the probability of becoming a CEO (in a firm other than the one founded by the focal individual), and the probability of experiencing unemployment spells. All these events refer to the first 15 years in the labor market in panel A. However, in Panel B we restrict the sample of ever entrepreneurs to those leaving entrepreneurship no later than year 10, and report estimates for the last five years of the period, in order to document effects after the entrepreneurial experience. Finally, panel C mimics panel A but only for early and never entrepreneurs. Because most early entrepreneurs end their spells after just one year, estimates are also likely to reflect a more refined measurement of the effect of entrepreneurial experience.

In panel A, we find that individuals sorting into entrepreneurial careers tend to be more mobile, since there is a positive association with both job mobility and industry mobility (columns 1 and 2). More precisely, the incidence rate of job (industry) changes is about 12% (17%) higher for those with entrepreneurial experience compared to graduates who have never had any experience in entrepreneurship during the first 15 years after graduation. Job and industry mobility could signal a greater taste for variety among those with entrepreneurial preferences. According to Topel and Ward (1992), job mobility is more common during the initial years in the labor market and it is positively associated with earnings growth, by allowing individuals to find better job matches. However, if mobility mostly reflects an individual's taste for variety, higher risk tolerance, and constant search for new jobs due to lack of fit, varied job market choices should negatively impact earnings (Åstebro and Thompson 2011; Frederiksen et al. 2016). Given that we find robust evidence for an earnings premium for those trying entrepreneurship in their career, even if early and shortly,

the greater mobility observed among ever entrepreneurs is unlikely to be purely driven by them being misfits in the labor market or by their possibly stronger taste for variety.

Interestingly, however, results in panels B and C evidence a reverse effect in job mobility after entrepreneurship. Graduates leaving entrepreneurship no later than year 10 are less likely to change jobs in the years 11 to 15. Early entrepreneurs are even less prone to job mobility during the entire period of time than those who never attempted entrepreneurship. These results are in line with the recent contribution by Failla et al. (2017), who found that former entrepreneurs in Denmark tend to find better matches after transitioning to wage employment, thus becoming less mobile than their counterparts without entrepreneurial experience. Nevertheless, industry changes seem to be more common among entrepreneurs regardless of the timing.

Job and industry mobility may also benefit the accumulation of general, more balanced skills (Lazear 2004, 2005). Murphy and Zábojník (2004) argue that general skills are transferable across companies and industries, and individuals with general skills—as opposed to firm- or industry-specific skills—are increasingly likely to reach managerial positions. In addition, Baptista et al. (2012) found that workers returning to the wage employment sector after a spell in entrepreneurship are more likely to become managers in the following years. If the experience accumulated in entrepreneurship has endowed the graduates in our sample with relatively more balanced and general skills than individuals without such experience, we should observe those with entrepreneurial experience to be more likely to achieve a CEO position. Perhaps surprisingly, we only observe a higher propensity to reach managerial positions (3% higher) among early entrepreneurs. Nevertheless, managerial positions are more commonly reached at older ages, so if we could cover later stages of graduates' careers the results could be more aligned with those found for early entrepreneurs. For the same reason, it is also possible that we are reporting a lower bound of the effect of early entrepreneurship on the likelihood to become a CEO. Finally, we find no evidence that entrepreneurial experience makes individuals more likely to become unemployed during their first 15 years in the labor market, which reveals that individuals with entrepreneurial experience do not necessarily have a harder time finding a job than those following a continuous career in wage employment.

Table 3.8 shows some additional differences in labor market transitions depending on the timing of entrepreneurial entry. First, we look at the propensity to engage in serial entrepreneurship. Those who try a career in entrepreneurship for a second time might be more convinced about their

ability as entrepreneurs and/or the quality of their ideas. They can also engage in serial venturing with the goal of correcting earlier mistakes in the first business, being thus more committed in the second attempt. In this sense, we observe that early entrepreneurs are about 4% less likely to become serial entrepreneurs than those with past wage employment experience. This may suggest that early and late entrepreneurs experiment about different aspects during their first entrepreneurial spell. Those who sort into entrepreneurship right after graduation might not be sufficiently aware of their capabilities, the feasibility of their ideas, or even their preferences and their potential fit to a career in entrepreneurship. Hence, these individuals are likely to experiment and learn about aspects related to themselves (the type of worker they might be) rather than testing the potential value of their current idea. Conversely, individuals who move to entrepreneurship later in life may have developed a preference for entrepreneurship and the non-pecuniary benefits associated with being their own bosses—or rather, an aversion to the wage employment sector—or could have identified a gap in the market and developed a promising idea which they would like to test. If their first attempt is not successful, they may decide to try again or test another idea, showing a higher preference for an entrepreneurial occupation.

In the second and third columns we look at differences in mobility across different employers and industries—in the last five years of the period considered—between early and late entrepreneurs. We find no significant differences in either job or industry mobility between the two types of entrepreneurs, which suggests that career mobility after entrepreneurship evolves similarly regardless of its timing. However, we do find that early entrepreneurs are almost 4% more likely to become top managers within 15 years since graduation. This result, together with those from Table 3.7, might imply that—at least in Denmark and during the time period considered here—individuals with a more stable career path reach managerial positions earlier than those moving across different occupations and employers in relatively later stages of their careers.

To sum up, our findings point to two key explanations for the differences in lifetime earnings based on whether and when individuals become entrepreneurs. First, our analysis reveals that individuals use entrepreneurship to experiment and learn either about themselves (their type and their potential fit to an entrepreneurial career) or about their ideas. Spells in entrepreneurship are typically brief, but even those as short as one year can still be informative enough to allow individuals to update their beliefs about the potential success of their current project. Brief experimentation periods are in fact preferable, as those who take too long to abandon unfruitful

ventures face larger penalties. Yet, the scope and goals of experimentation and learning from entrepreneurship might differ depending on the timing of entry. When experimentation with entrepreneurship happens early in the career, this stage seemingly serves as a quick way to learn about one's skills and fit to entrepreneurship as an occupation. High-skill individuals doing so in our sample seem to become much more stable in the labor market—as wage employees—by changing jobs less often than those never trying entrepreneurship. Entrepreneurial spells at later stages are instead, and by and large, used to test—and refine, via serial venturing—a particular idea, being possibly more motivated by the identification of a market opportunity that compensates their greater opportunity costs of leaving wage employment.

Second, besides being a source of information about the quality of both individuals and their ideas, we do not exclude the validity of entrepreneurship experience being a source of skills that are valued by subsequent employers too. We observe that, even though individuals with a preference for entrepreneurship also exhibit greater mobility (especially across industries), they become more stable after trying entrepreneurship, and especially if this experimentation with an entrepreneurial occupation takes place in the very beginning of their career. Such greater mobility does not seem to reflect labor market misfits or a pure taste for variety, which would be incompatible with the earnings premium found for those trying entrepreneurship, even if shortly and early in one's career. Instead, early trials with entrepreneurship together with more varied industry experience might endow individuals with a balanced set of skills that allows them achieve managerial positions relatively earlier in their careers.

3.7 Discussion and Conclusion

Recent studies have suggested that entrepreneurship should not be regarded as an irreversible end-state in a transition from a different occupation, but instead ought to be treated as a step along a career that allows individuals to learn and experiment (Burton et al. 2016). Indeed, contrary to the earnings disadvantage in entrepreneurship that prior research used to find (e.g. Hamilton 2000), latest works adopting a career perspective have found that there is value in experimenting with entrepreneurship (e.g. Manso 2016). This paper builds on this newly established literature and contributes by theorizing about, and empirically testing, the role of the timing of entrepreneurial entry. More precisely, we examine differences in earnings dynamics between individuals who start

their careers as entrepreneurs (early entrepreneurs), individuals who become entrepreneurs later in their careers (late entrepreneurs), and those who never attempt entrepreneurship (never entrepreneurs). We used register data from Denmark to identify all university students graduating from Danish institutions who were about to start their professional careers and tracked them for their first 15 years in the labor market. By focusing on these highly educated individuals, we intended to capture the section of the population where necessity entrepreneurship is less concerning and where innovation, creativity, and human capital are more prevalent. The richness of our data allowed us to perform thorough matching techniques which minimized the influence of self-selection based on observable characteristics and largely absorbed the potential impact of unobserved ability and preferences.

In line with our expectations, we found that individuals with entrepreneurial experience enjoy higher lifetime earnings than those who never became entrepreneurs. On average, individuals who were ever entrepreneurs earned a premium of approximately 14% per year during the entire period, and negative differences were only present at the lower tail of the income distribution. Furthermore, and as hypothesized, late entrepreneurs exhibited higher earnings than early entrepreneurs and their start-ups were larger, survived longer, achieved higher profits, and were more likely to hire employees in subsequent years.

We further tested a number of underlying mechanisms which might explain such results. We first explored the role of the duration of the first entrepreneurial spell. Our results pointed to a U-shaped relationship between the number of years spent in entrepreneurship and lifetime earnings. Furthermore, individuals abandoning potentially under-performing business after only one year in entrepreneurship were able to minimize potential losses. This was particularly true for early entrepreneurs, who would otherwise face higher risks of suffering persistent penalties. Second, we examined the labor market dynamics of the different groups of individuals. We found that individuals with entrepreneurial experience exhibited a higher degree of job and industry mobility in the overall time period. However, they became less likely than never entrepreneurs to change jobs once they had ended their first entrepreneurial spell. This suggests that entrepreneurship allows individuals to quickly learn about their fit to entrepreneurship as an occupation and are then more able to find good fits in the labor market. Moreover, early entrepreneurs were more likely to reach managerial positions within the period covered, which could be evidence of entrepreneurship as a source of certain skills than are valued by subsequent employers and in particular roles, such

as CEO positions. Individuals with entrepreneurial experience were also less likely to experience unemployment spells, which further minimizes concerns of necessity-driven entrepreneurs and confirms the potential stabilizer effect of experimenting with entrepreneurship (Failla et al. 2017). Finally, comparisons between early and late entrepreneurs showed that the latter were more likely to engage in serial entrepreneurship. Combined with the fact that they run larger and longer start-ups, we interpret these results as evidence that late entrepreneurs have a stronger preference for an entrepreneurial occupation and are therefore more willing to engage in several trials in order to be successful. It also suggests that early entrepreneurs were less likely to experiment about a particular idea, but instead experimented and learned about themselves, i.e., their own type, ability, and thereby their (lack of) fit to an entrepreneurial career.

Taken together, our results suggest that not only earnings and careers differ based on whether individuals become entrepreneurs, but also depending on when in their careers they make this transition. Our study therefore brings new evidence on the complexity of entrepreneurship as an occupational choice, since individuals face a trade-off between entering early and maximizing the time horizon to collect potential profits and entering later in their careers in order to improve the chances of achieving success. While it is not the goal of our study to identify an optimal time to enter entrepreneurship, we do highlight that experimenting with a career in entrepreneurship pays off, but also that rushed start-ups are riskier and may lead to potential persistent penalties unless learning occurs quickly. In addition, we do not claim to provide tools for policy makers, as it appears evident that individuals sorting into entrepreneurship at different moments in their careers are fundamentally different and are likely seeking different outcomes by trying a career as entrepreneurs before or after accumulating some relevant work experience. Nevertheless, policy makers might find our results insightful as to whether entrepreneurship should be encouraged among young students, given that early experiences can still play a determinant role in future labor market outcomes.

We acknowledge a number of limitations in our analysis. First and foremost, our data did not allow us to explicitly distinguish between incorporated and unincorporated entrepreneurs, which have been shown to differ in many ways (Levine and Rubinstein 2017). In fact, most of the entrepreneurs in our sample tend to be self-employed—i.e. without employees—, which might not be considered the most desirable form of entrepreneurship from a growth- and innovation-potential point of view. Yet, this implies that our estimates are likely a lower bound of the returns

to entrepreneurial experience, since incorporated entrepreneurs tend to be more successful and exhibit even higher earnings. Hence, an analysis restricted to incorporated entrepreneurs would probably increase the magnitude of our estimates.

Second, although our decision to focus on university graduates ensured that we had a relatively homogeneous sample in terms of ability, besides allowing to more precisely identify the moment when they first entered the labor market full-time, and minimizing necessity-driven entrepreneurship, we recognize some limitations in generalizing our results to the full population. Smaller returns to entrepreneurship are to be expected in analyses including individuals with lower education. Relatedly, we are also aware that the Danish labor market is relatively unique by being rather flexible and not necessarily stigmatizing high job mobility and entrepreneurial failure. Hence, it would be interesting to understand how entrepreneurial experience might shape careers in more rigid labor markets. We thus encourage future studies to embrace the empirical challenges involved in a study covering the broad population in different institutional settings, which would certainly complement our analysis in important ways.

Finally, although our matching is rather comprehensive and thorough, we cannot completely rule out the potential effects of unobserved traits affecting entrepreneurial behavior. Factors such as tolerance to risk, uncertainty, loss aversion (Holm et al. 2013; Hvide and Panos 2014; Koudstaal et al. 2015), overconfidence (Hayward et al. 2006), overoptimism (Dushnitsky 2010; Lowe and Ziedonis 2006), or a desire to find higher levels of job satisfaction (Benz and Frey 2008a, 2008b) might explain whether and when individuals become entrepreneurs. Even though we see no major reason to believe that such psychological traits would drastically affect our results, further research could consider the role of these characteristics in the relationship between entrepreneurial experience, lifetime earnings, and career dynamics.

Table 3.1: **Descriptive statistics**

	Early entrep.		Late entrep.		Never entrep.	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Average yearly income						
Years 1-15	367.34	288.11	372.84	258.10	307.24	139.82
Years 1-5	242.87	165.24	269.41	132.90	241.83	73.44
Years 6-10	388.33	379.95	371.91	257.44	311.06	142.31
Years 11-15	471.06	441.96	476.15	494.01	368.66	246.93
Demographics at graduation						
Graduation age	25.94	2.02	25.93	1.94	25.48	1.89
Female ratio	0.34	0.47	0.49	0.50	0.67	0.47
Copenhagen area	0.62	0.48	0.56	0.50	0.48	0.50
Unmarried	0.90	0.30	0.90	0.31	0.91	0.29
Children (Y/N)	0.05	0.22	0.07	0.25	0.06	0.24
Living with parents (Y/N)	0.11	0.32	0.09	0.28	0.10	0.30
High-school GPA	6.38	0.70	6.46	0.74	6.26	0.71
Experience	2.47	3.89	2.72	3.76	2.89	3.76
Net assets	83.47	856.36	4.00	512.96	−0.05	586.69
Field: Pedagogy	0.04	0.20	0.09	0.28	0.23	0.42
Field: Health	0.14	0.35	0.23	0.42	0.25	0.43
Field: IT & Comm.	0.09	0.29	0.09	0.29	0.10	0.30
Field: STEM	0.30	0.46	0.26	0.44	0.25	0.43
Field: Business/Econ.	0.38	0.48	0.29	0.45	0.16	0.37
Field: Arts	0.05	0.23	0.04	0.19	0.01	0.09
Postgraduates ratio	0.39	0.49	0.43	0.50	0.25	0.43
Years at university	4.33	1.95	4.42	1.97	3.92	1.73
Parental income	626.39	929.95	597.90	611.00	511.41	359.16
Parental net assets	1,394.62	5,664.28	911.28	3,402.44	674.50	2,424.38
Parental tertiary educ.	0.49	0.50	0.49	0.50	0.41	0.49
Parents ever entrep.	0.40	0.49	0.40	0.49	0.32	0.47
Industry at entry						
Undisclosed	0.15	0.36	0.01	0.08	0.01	0.07
Manufacturing	0.08	0.28	0.14	0.34	0.15	0.36
KIBS	0.47	0.48	0.38	0.49	0.35	0.48
Other services	0.23	0.42	0.13	0.34	0.11	0.31
Health and educ.	0.06	0.24	0.34	0.47	0.39	0.49
Labor market dynamics, first 15 years						
Ever CEO	0.17	0.37	0.09	0.29	0.10	0.31
Secondary jobs (Y/N)	0.17	0.37	0.27	0.45	0.21	0.40
Secondary wage	0.69	2.56	1.47	4.51	4.79	2.62
Number of job changes	1.89	1.80	2.81	1.82	2.17	1.75
Number of industries	2.31	0.95	2.32	0.97	1.80	0.83
Years unemployed	0.40	0.97	0.50	1.06	0.31	0.87
Years inactive	0.46	1.25	0.50	1.22	0.28	1.04
Individuals	1,103	1.03%	8,248	7.68%	98,059	91.29%

Notes. All monetary figures expressed in thousands of DKK from the year 2000.

Table 3.2: **Determinants of the timing of entrepreneurial entry**

	Multinomial logit model			Duration
	Prob(late)	Prob(early)	χ^2 test	model
	(1)	(2)	(3)	(4)
Graduation age	0.085***	0.111***	1.30	−0.081***
	(0.008)	(0.022)		(0.007)
Female	−0.606***	−1.141***	41.08***	0.617***
	(0.029)	(0.079)		(0.026)
Copenhagen area	0.227***	0.482***	14.28***	−0.240***
	(0.024)	(0.064)		(0.021)
Unmarried	−0.078*	−0.147	0.33	0.074**
	(0.042)	(0.116)		(0.036)
Children (Y/N)	0.140***	0.022	0.55	−0.107**
	(0.052)	(0.154)		(0.045)
Living with parents (Y/N)	−0.122***	−0.024	0.81***	0.095**
	(0.043)	(0.101)		(0.037)
High-school GPA	0.185***	0.043	7.75***	−0.147
	(0.019)	(0.048)		(0.016)
Experience	−0.023***	−0.057***	5.45**	0.025***
	(0.004)	(0.014)		(0.003)
Net assets	−0.000	−0.000	0.62	0.000
	(0.000)	(0.000)		(0.000)
Field: Pedagogy	−0.976***	−1.342***	4.17**	0.913***
	(0.046)	(0.174)		(0.041)
Field: IT & Comm.	–0.192***	0.253*	9.44***	0.122***
	(0.047)	(0.138)		(0.040)
Field: STEM	−0.367***	−0.038	7.02***	0.294***
	(0.041)	(0.118)		(0.035)
Field: Business/Econ.	0.126***	0.715***	24.67***	−0.181***
	(0.040)	(0.113)		(0.034)
Field: Arts	1.021***	1.737***	15.66***	−1.029***
	(0.077)	(0.173)		(0.066)
Postgraduate diploma	0.277***	−0.213**	27.34***	−0.174***
	(0.035)	(0.089)		(0.030)
Years at university	−0.029***	0.111***	0.10	0.030***
	(0.009)	(0.022)		(0.007)
Parental income	0.082***	−0.037*	0.11	−0.001***
	(0.000)	(0.022)		(0.000)
Parental assets	0.000	0.002*	4.16**	−0.000
	(0.000)	(0.001)		(0.000)
Parental tertiary educ.	0.089***	0.036	0.58	−0.072***
	(0.025)	(0.065)		(0.021)
Parental entrepreneurship	0.356***	0.376	0.09	−0.327***
	(0.024)	(0.064)		(0.021)

Notes: $N = 107,410$. The baseline in the multinomial model is "never entrepreneur", and the reference for field is Health. Column (3) reports tests for the difference of coefficients in (1) and (2). Column (4) shows estimates for the time to the first entrepreneurial experience.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.3: **Earnings differences between ever and never entrepreneurs**

	Mean	25^{th} pct.	50^{th} pct.	75^{th} pct.
Years 1 to 15	44.292***	−3.362**	11.767***	42.335***
	(3.449)	(1.299)	(1.769)	(2.599)
Years 1 to 5	7.015***	−5.031***	7.134***	12.809***
	(1.643)	(0.992)	(1.053)	(1.315)
Years 6 to 10	32.159***	−6.313***	12.611***	37.195***
	(3.162)	(1.387)	(1.686)	(2.662)
Years 11 to 15	61.883***	−25.695***	8.421***	69.440***
	(7.369)	(1.839)	(2.594)	(4.544)
Ever entrepreneurs		9,351		
Never entrepreneurs		98,059		
Total individuals		107,410		

Notes: All monetary figures expressed in DKK from 2,000. Estimates obtained through matched samples. Robust standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.4: **Earnings differences between early and late entrepreneurs**

	Mean	25^{th} pct.	50^{th} pct.	75^{th} pct
Years 1 to 15	−30.080**	−2.250	−10.250	−37.357***
	(11.814)	(4.411)	(6.904)	(9.752)
Years 1 to 5	−32.997***	−44.967***	−38.636***	−23.740***
	(7.758)	(4.712)	(4.651)	(6.194)
Years 6 to 10	−3.460	2.259	−3.931	−27.061***
	(13.133)	(6.254)	(6.492)	(9.802)
Years 11 to 15	−45.539***	8.285	−6.226	−46.678***
	(16.402)	(7.798)	(7.373)	(15.318)
Early entrepreneurs		1,103		
Late entrepreneurs		8,248		
Total individuals		9,351		

Notes: All monetary figures expressed in DKK from 2,000. Estimates obtained through matched samples. Robust standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.5: **First start-up performance of early and late entrepreneurs**

	start-up size (1)	Entrep. earnings (2)	Spell duration (3)	Prob(hiring) (4)
Panel A: Effect of early entrepreneurship compared to late entrepreneurship				
Early entrepreneurship	−1.346***	−133.650***	−0.535***	−0.026*
	(0.186)	(9.365)	(0.163)	(0.014)
Early entrepreneurs	1,099	1,103	1,103	620
Late entrepreneurs	8,150	8,248	8,248	5,389
Total individuals	9,249	9,351	9,351	6,009
Panel B: Effect of prior wage employment experience (in years)				
Prior experience	0.164***	17.917***	0.020	0.001
	(0.018)	(1.325)	(0.014)	(0.001)
Total individuals	9,249	9,351	9,351	6,009

Notes: Column (1) reports estimates from negative binomial regressions for start-up size, measured as the number of workers employed in the company in the first year. Column (2) reports OLS estimates for entrepreneurial earnings in the first year of the start-up. Estimates in column (3) come from tobit regressions for the spell duration (in years) of the first entrepreneurial spell (520 right-censored observations at year 14). Marginal effects from logit regressions for the likelihood of hiring employees in the second year of start-up (conditional on surviving the first year) are reported in column (4). Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.6: **The role of the duration of the first entrepreneurial spell**

	Mean	25th pct.	50th pct.	75th pct.
Panel A: Duration of first entrepreneurial spell = 1 year (Ever entrep.)				
Years 1 to 15	33.398***	−8.151***	0.525	22.295***
	(5.747)	(1.992)	(2.754)	(3.999)
Years 1 to 5	6.539**	−6.124***	1.296	5.958**
	(2.592)	(1.569)	(1.836)	(2.467)
Years 6 to 10	25.495***	−11.368***	−2.545	17.435***
	(6.779)	(2.109)	(3.311)	(4.221)
Years 11 to 15	28.840***	−28.296***	−14.930***	15.416***
	(9.641)	(2.284)	(3.901)	(5.516)
Ever entrepreneurs		2,943		
Never entrepreneurs		98,059		
Total individuals		101,002		
Panel B: Duration of first entrepreneurial spell = 1 year (Early entrep.)				
Years 1 to 15	33.834***	−1.577	0.698	4.809
	(12.695)	(5.534)	(5.222)	(7.677)
Years 1 to 5	−4.781	−14.456***	−12.110**	−5.577
	(7.524)	(2.846)	(4.942)	(5.385)
Years 6 to 10	36.569	−9.552	−5.128	−3.464
	(21.490)	(7.781)	(5.223)	(6.412)
Years 11 to 15	35.435*	−14.108**	−9.557*	22.258
	(18.276)	(6.344)	(5.372)	(16.281)
Early entrepreneurs		459		
Never entrepreneurs		98,059		
Total individuals		98,518		
Panel C: Effect of an additional year in the first entrepreneurial spell				
Spell duration	−4.791**	0.860	−1.354	−4.656**
	(2.312)	(0.742)	(1.236)	(1.909)
Spell duration squared	0.516***	0.017	0.300***	0.688***
	(0.171)	(0.056)	(0.095)	(0.148)
Ever entrepreneurs		9,351		

Notes: All monetary figures expressed in DKK from 2,000. Estimates obtained through matched samples. Robust standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.7: **Entrepreneurial experience and labor market dynamics**

	Job mobility	Industry mobility	Prob(CEO)	Prob(unemp)
	(1)	(2)	(3)	(4)
Panel A: Results for the entire period (Ever entrepreneurs)				
Ever entrepreneurship	0.122***	0.175***	−0.044***	−0.034***
	(0.008)	(0.005)	(2.754)	(0.005)
Ever entrepreneurs			9,351	
Never entrepreneurs			98,059	
Total individuals			107,410	
Panel B: Entrep. spell ends no later than year 10 (results for years 11-15)				
Ever entrepreneurship	−0.047**	0.082***	−0.025***	−0.028***
	(0.022)	(0.007)	(0.004)	(0.004)
Ever entrepreneurs			4,893	
Never entrepreneurs			98,059	
Total individuals			102,952	
Panel C: Results for the entire period (Early entrepreneurs)				
Early entrepreneurship	−0.311***	0.083***	0.031**	−0.004
	(0.031)	(0.014)	(0.012)	(0.014)
Early entrepreneurs			1,103	
Never entrepreneurs			98,059	
Total individuals			99,162	

Notes: Job mobility in column (1) is measured as the number of employer changes and is estimated through negative binomial regressions. Situations in which the change of employer is due to a change of ownership in the firm where an individual is currently employed are not included. Industry mobility in column (2) refers to 1-digit level changes on the ISIC classification, and estimates come from negative binomial regressions. Column (3) contains marginal effects for the probability of becoming a CEO, obtained after logit regressions. Cases where an entrepreneur becomes the CEO of her own company are not included. In column (4), marginal effects from logit regressions for the probability of experiencing an unemployment spell are provided. Robust standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.8: **Timing of entrepreneurial entry and labor market dynamics**

	Prob(serial) (1)	Job mobility (2)	Industry mobility (3)	Prob(CEO) (4)
Early entrepreneurship	−0.044***	0.091	−0.013	0.038**
	(0.017)	(0.062)	(0.019)	(0.017)
Early entrepreneurs			1,103	
Late entrepreneurs			3,861	
Total individuals			4,893	

Notes: Entrepreneurial spells end no later than year 10. Column (1) contains marginal effects from logit regressions for the probability of becoming a serial entrepreneur within the next three years upon terminating the first entrepreneurial venture. Results in columns (2) to (4) refer to years 11 to 15. Notes for job mobility, industry mobility, and probability of becoming a CEO as in table 3.7. Robust standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 3.1: **Earnings profiles of early, late, and never entrepreneurs**

Appendix B

Table B.1: **Earnings differences between early and never entrepreneurs**

	Mean	25^{th} pct.	50^{th} pct.	75^{th} pct.
Years 1 to 15	14.169	−14.032***	−4.180	4.243
	(9.585)	(3.685)	(4.888)	(8.006)
Years 1 to 5	−25.448***	−53.005***	−33.170***	−14.038***
	(5.510)	(3.354)	(4.308)	(5.124)
Years 6 to 10	21.529*	−13.451***	−4.747	10.438*
	(11.902)	(5.090)	(5.138)	(5.791)
Years 11 to 15	15.664	−28.413***	−6.898	15.602
	(14.431)	(4.919)	(5.204)	(11.184)
Early entrepreneurs		1,103		
Never entrepreneurs		98,059		
Total individuals		99,162		

Notes: All monetary figures expressed in DKK from 2,000. Estimates obtained through matched samples. Robust standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.2: **Earnings differences between late and never entrepreneurs**

	Mean	25^{th} pct.	50^{th} pct.	75^{th} pct.
Years 1 to 15	50.909***	−1.437	15.016***	47.232***
	(3.247)	(1.443)	(1.818)	(2.730)
Years 1 to 5	11.786***	0.365	10.724***	15.491***
	(1.570)	(1.014)	(1.090)	(1.403)
Years 6 to 10	34.031***	−5.814***	14.333***	41.238***
	(3.104)	(1.454)	(1.885)	(2.744)
Years 11 to 15	71.310***	−25.625***	10.255***	77.151***
	(6.144)	(1.802)	(2.851)	(4.991)
Late entrepreneurs		8,248		
Never entrepreneurs		98,059		
Total individuals		106,307		

Notes: All monetary figures expressed in DKK from 2,000. Estimates obtained through matched samples. Robust standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.3: **Balance of covariates: Ever and never entrepreneurs (graduation year dummies omitted for simplicity)**

	Mean			Variance			Skewness		
	Ever entrep.	Never entrep.		Ever entrep.	Never entrep.		Ever entrep.	Never entrep.	
		Original	Matched		Original	Matched		Original	Matched
Graduation age	25.930	25.480	25.930	3.790	3.576	3.790	−0.085	−0.040	−0.084
Female ratio	0.474	0.669	0.474	0.249	0.221	0.250	0.104	−0.718	0.104
Copenhagen area	0.569	0.483	0.569	0.245	0.250	0.245	−0.277	0.675	−0.277
Unmarried	0.896	0.909	0.894	0.093	0.083	0.093	−2.601	−2.843	−2.601
Children (Y/N)	0.065	0.611	0.065	0.061	0.057	0.061	3.514	3.664	3.514
Living with parents (Y/N)	0.091	0.101	0.091	0.083	0.090	0.083	2.846	2.656	2.846
High-school GPA	6.451	6.262	6.451	0.547	0.498	0.547	0.036	0.203	0.036
Experience	2.688	2.892	2.687	14.230	14.150	14.230	3.177	3.039	3.177
Net assets / 1,000	13.370	−0.045	13.370	319,180	344,208	319,187	27.730	207.600	43.520
Field: Health	0.222	0.247	0.222	0.173	0.186	0.173	1.336	1.174	1.336
Field: IT & Comm.	0.093	0.098	0.093	0.084	0.088	0.084	2.804	2.703	2.804
Field: STEM	0.268	0.251	0.268	0.196	0.188	0.196	1.046	1.148	1.046
Field: Business/Econ.	0.298	0.165	0.298	0.209	0.138	0.209	0.883	1.807	0.882
Field: Arts	0.428	0.249	0.428	0.037	0.009	0.037	4.812	10.40	4.812
Postgraduates ratio	0.428	0.249	0.428	0.245	0.187	0.245	0.291	1.164	0.291
Years at university	4.407	3.920	4.407	3.859	2.992	3.859	0.180	0.436	0.180
Parental income / 1,000	601.300	511.400	601.300	439,293	128,996	431,288	6.247	12.120	6.250
Parental tertiary educ.	0.486	0.410	0.486	0.250	0.242	0.250	0.058	0.365	0.058
Parental entrepreneurship	0.402	0.321	0.402	0.240	0.278	0.240	0.399	0.767	0.399
Manufacturing	0.131	0.149	0.131	0.114	0.127	0.114	2.186	1.974	2.186
KIBS	0.392	0.351	0.392	0.238	0.228	0.238	0.422	0.622	0.442
Health and education	0.307	0.389	0.307	0.213	0.238	0.213	0.839	0.457	0.839
Other services	0.146	0.106	0.146	0.125	0.095	0.125	2.005	2.559	2.005

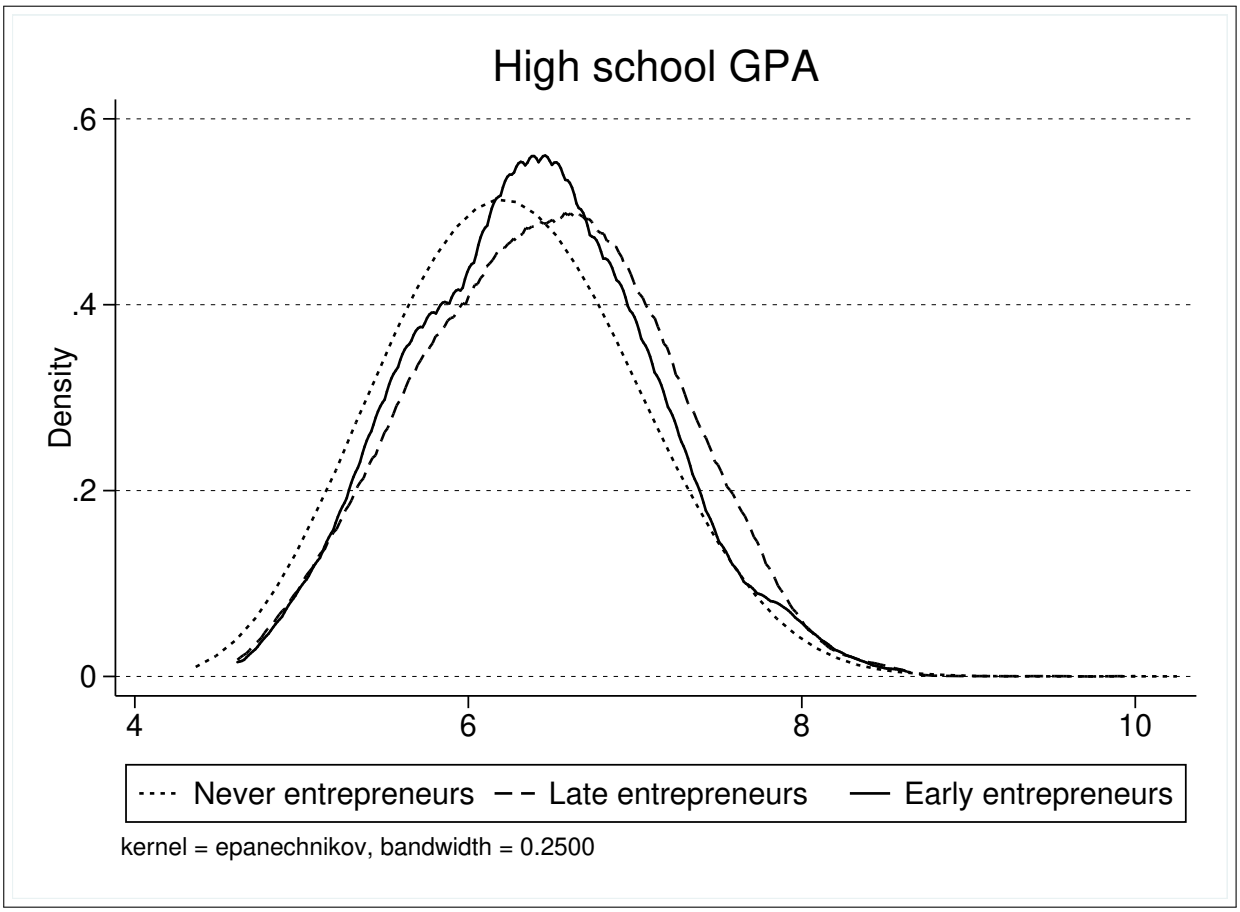

Figure B.1: **High-school GPA of early, late, and never entrepreneurs**

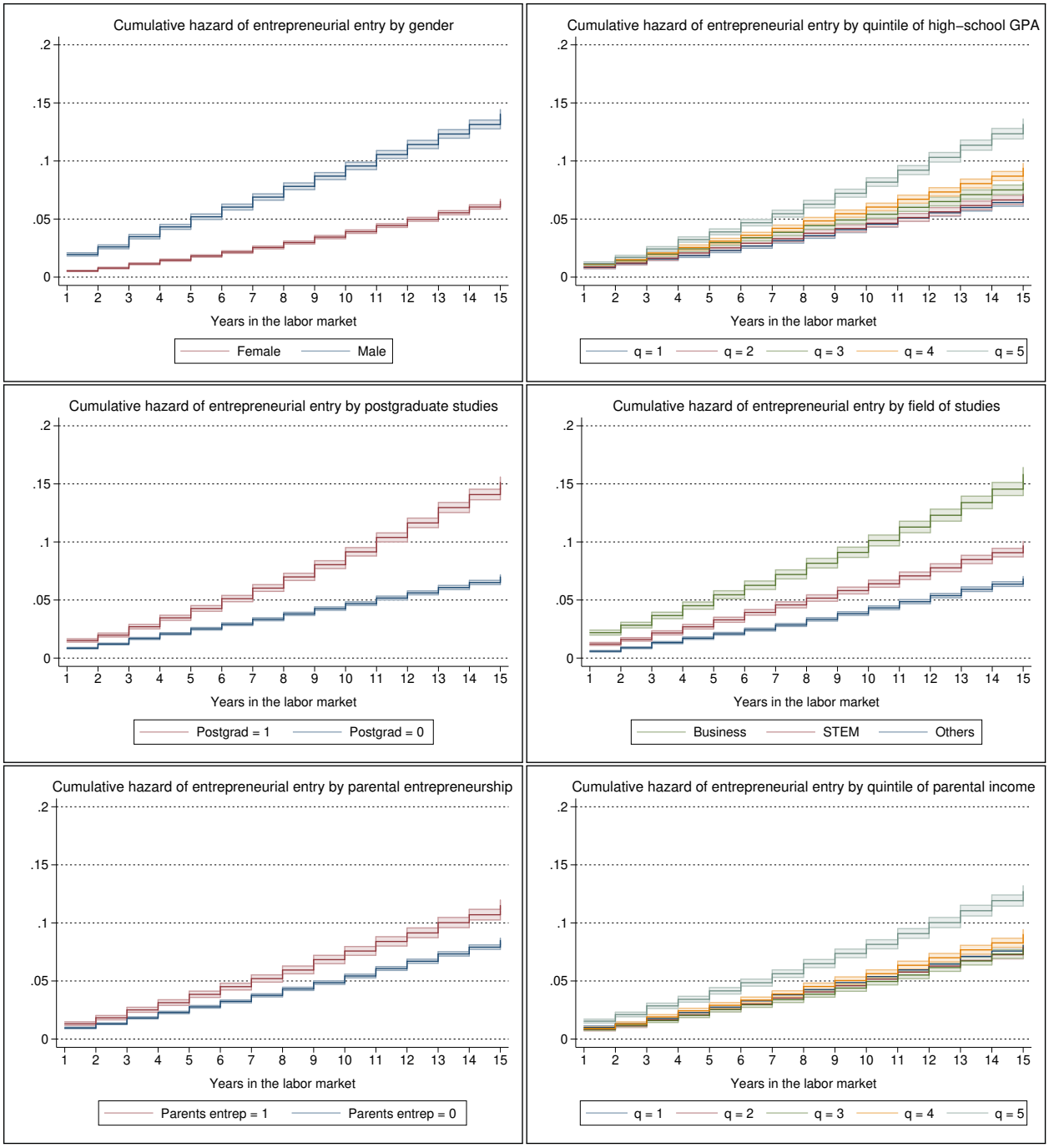

Figure B.2: **Nelson-Aalen cumulative hazard estimates for entrepreneurial entry**

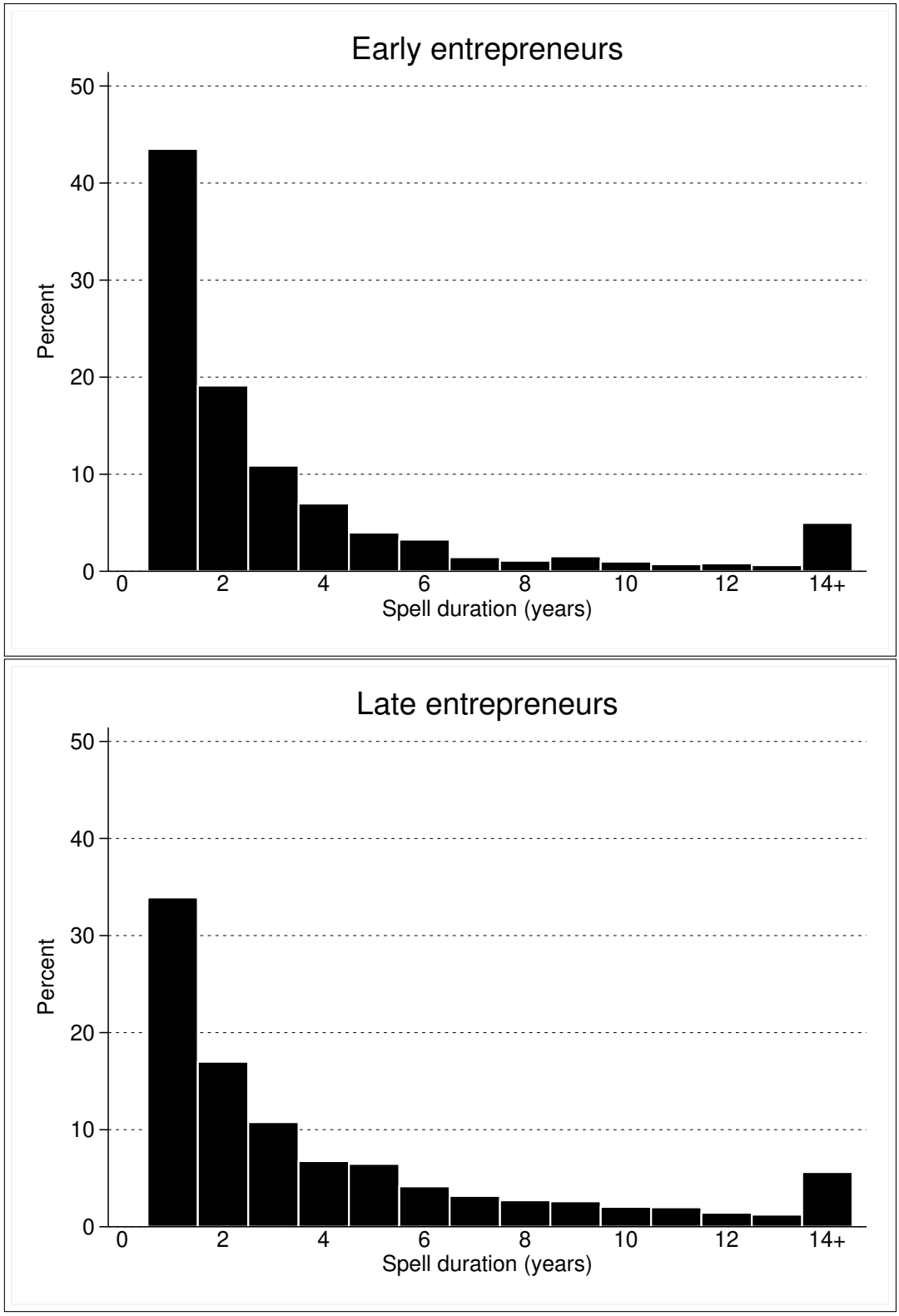

Figure B.3: **Duration of the first entrepreneurial spell of early and late entrepreneurs**

Chapter 4

Entrepreneurial Experience and Executive Pay

Adrian L. Merida

Department of Strategy and Innovation

Copenhagen Business School

4.1 Introduction

Executive compensation remains a hot topic in the finance and management literatures. In particular, scholars have directed a substantial part of their attention to how the pay that executive officers receive is determined. Tervio (2008) and Gabaix and Landier (2008) argue that CEO compensation is the result of the interplay between firms and managers within the frame of a competitive market. The models in both studies predict that more talented managers are more likely to be hired by larger, more valuable firms, and that small differences in CEO ability lead to relatively large fluctuations in CEO pay, as firms compete to attract individuals from a relatively scarce pool. A natural question that arises is, therefore, which abilities or skills explain CEO compensation.

An interesting differentiation between general and specific managerial skills was suggested by Murphy and Zábojník (2004) to explain why executive compensation levels have increased substantially over the last few decades. While the increasing trend in executive pay has often been attributed to rent extraction (Bebchuk et al. 2002), Murphy and Zábojník (2004) argue that it is also due to a change in the type of managerial skills associated with running modern firms. Specifically, as firms have become more complex, the demand for managers with *general skills* has increased. In line with this reasoning, Custódio et al. (2013) report that CEOs with general managerial skills tend to earn a higher compensation. In contrast with firm-specific skills, general managerial skills are those that can be transferred across companies and industries, and are gathered by individuals through a varied educational or professional background. Hence, it appears evident that heterogeneity in CEO ability and pay can be explained, at least partially, by prior career experiences.

In this paper, I explore the role of entrepreneurial experience as an additional determinant of CEO pay. Entrepreneurship features a different set of characteristics and conditions compared to other occupations in the wage employment sector (Benz and Frey 2008a, 2008b; Hamilton 2000), which may lead to different career paths (Failla et al. 2017) and earning profiles in the future (Manso 2016). In fact, it has been documented that the chances of reaching managerial positions in the wage employment sector increase after brief periods in entrepreneurship (Baptista et al. 2012). However, the relationship between entrepreneurial experience and executive compensation has not been explicitly studied in the past, and there are arguments to support either a potential penalty

or a premium. On the one hand, entrepreneurs are more likely to possess a more general set of skills and knowledge than paid employees because running a business entails more diverse tasks and situations to be coped with on a daily basis (Lazear 2004, 2005). On the other hand, some studies found that entrepreneurial spells may cause an earnings penalty in subsequent paid jobs compared to a continued history in wage employment (e.g. Bruce and Schuetze 2004; Hyytinen and Rouvinen 2008; Kaiser and Malchow-Møller 2011; Williams 2000). Hence, this study contributes to the extant literature by providing the first set of empirical evidence on this relationship.

In order to empirically assess the effect of past entrepreneurial experience on executive compensation, I rely on rich administrative data from the registers of Denmark (the IDA database). This detailed dataset allows matching managers and firms, and it provides information both at the individual and firm levels. In my final sample, there is a total of 22,239 individuals who become top managers for the first time in their careers in the year 2000 or later, and 18,192 firms operating in Denmark during the period 2000 to 2012. Out of the total number of top CEOs, 4,116 (or 18.51%) had been entrepreneurs in the past. Descriptive statistics show that managers with entrepreneurial experience tend to receive a higher compensation than non-entrepreneurs. Former entrepreneurs differ from non-entrepreneurs in their personal attributes and in the types of companies they sort into. For instance, the former are more likely to sort into smaller and younger firms, which is a preference that has been found in different contexts (Elfenbein et al. 2010; Sørensen and Fassiotto 2011). Yet, I find that managers with entrepreneurial experience earn a higher pay even after accounting for such differences. Nevertheless, the premium does vary significantly across entrepreneurial managers, depending on aspects such as the degree of success of their ventures or the industry where it operated.

The rest of the paper is structured in the following way. Section 4.2 contains a selective review of related literature. Section 4.3 describes the sample and the empirical approach used in the analysis. Results and diverse heterogeneous effects are presented and discussed in section 4.4. Finally, section 4.5 concludes the paper.

4.2 Related Literature and Theoretical Considerations

At the very least, this study contributes to two different streams of literature: (i) the entrepreneurship literature, in particular to the line of research devoted to the analysis of the effects

of entrepreneurial experience on subsequent earnings and career prospects, and (ii) the literature on determinants of executive compensation, specifically in the discussion of what skills explain executive pay. This section describes the state of the art in both streams of literature, and discusses the main theoretical arguments that can be extracted from them and that are applicable to this particular study. Note, however, that arguments will be presented supporting both a positive and a negative relationship, and given the mixed arguments, this section does not explicitly develop formal hypotheses.

4.2.1 Entrepreneurial Experience and Subsequent Earnings

Whether a history of entrepreneurial experience is a valuable asset or not is still under intense debate in the literature. A seminal study on the effects of entrepreneurial on subsequent earnings and success in the labor market was developed by Evans and Leighton (1989). They found no significant difference in subsequent wages among workers who had an entrepreneurial spell compared to those who remained in wage employment continuously. However, subsequent works have reached different conclusions. For example, results in Williams (2000) pointed to the existence of a penalty only for female workers who had an entrepreneurial spell, in the U.S., while Bruce and Schuetze (2004) found that the gap is there only for male employees. In any case, both studies find that there is indeed a penalty for workers with entrepreneurial experience, in contrast with the results provided by Evans and Leighton (1989).

The earnings differential seems to be larger in Europe than in the U.S. (Hyytinen and Rouvinen 2008). In Denmark, Kaiser and Malchow-Møller (2011) provide evidence that the typical negative effect of entrepreneurial experience is susceptible to become positive when the entrepreneurial spell is successful or when the industry of entrepreneurship and subsequent wage employment is the same. Baptista et al. (2012) show that a history of past entrepreneurial experience yields lower returns in subsequent wage employment than a continued wage work experience, in Portugal. However, they also find that entrepreneurial experience is associated with higher probabilities of reaching managerial positions. Thus, individuals who have acquired managerial skills while running their companies in the past have, in their own words, *"an advantage in progressing up the job ladder towards more managerial job levels"*.

In contrast with the aforementioned works, Campbell (2013) finds that employees who joined start-ups enjoy a premium in earnings compared to employees without start-up experience. While

this approach is slightly different from the papers cited above, as the subject of analysis is an employee who joined a start-up rather than starting up a company themselves, one could argue that employees working in start-ups are likely to develop similar human capital and skills than the entrepreneurs themselves (Elfenbein et al. 2010; Gompers et al. 2005).[1] Furthermore, Manso (2016) demonstrates that lifetime earnings for individuals with entrepreneurial experience are higher than for those who never experiment with entrepreneurship. Moreover, even though most entrepreneurs fail, he finds that they are able to switch back to wage employment quickly to minimize potential losses, and that the few entrepreneurs who succeed earn substantially more income than individuals who never were entrepreneurs.

Because of the mixed results, and given the particularities of the market for CEOs, it appears evident that the extant entrepreneurship literature is not enough to conclude that managers with experience as entrepreneurs would enjoy a higher pay, even though the most recent works seem to point in that direction. Although it is the aim of this paper to shed light on this matter by assessing it from an empirical perspective, there are further considerations that need to be discussed before moving on to the analysis.

4.2.2 General Skills and CEO Compensation

There is an ongoing debate as to whether CEO pay depends primarily on firm size or on firm profitability. Presumably, the latter is more likely to reflect the ability of the CEO to run the firm. Thus, the question is ultimately whether CEO compensation is mainly driven by individual characteristics or by firm characteristics. Agarwal (1981) proposed a model of executive compensation in which both individual and organizational variables were included. Results suggested that human capital of the executives is less relevant than organizational aspects such as job complexity or the employer's ability to pay. More recently, Tervio (2008) and Gabaix and Landier (2008) applied assignment models to represent the market for CEOs, in which managers are assigned to firms within the frame of a competitive market. Both models predict that more talented CEOs are more likely to be hired by larger and more valuable firms, and in both cases CEO compensation increases with firm size. However, the two models predict that differences in CEO ability, albeit small, would cause big variations in pay.

[1] Sørensen (2007a) finds that workers from small companies are more likely to become entrepreneurs than their counterparts from larger organizations. Elfenbein et al. (2010) refer to this phenomenon as the *small firm effect*, and show that individuals sorting into small firms possess similar preferences and skills than entrepreneurs, and also develop entrepreneurial skills while working at small firms.

Thus, even if firm characteristics account for a large proportion of CEO compensation, individual skills also play a relevant role in explaining pay disparities. After examining almost 300 CEO departures, Chang et al. (2010) found that the stock price reaction is negatively associated to the performance that the firm showed before departure and the pay that the CEO had. Moreover, the post-departure performance of the CEOs is positively associated to their pre-departure performance, while post-departure of the firm gets worse. This set of results provides further evidence that CEO pay and their ability to run the firm are positively related.

However, little evidence is currently available in the literature as to which skills matter the most in determining CEO pay. This is mostly due to the fact that skills are difficult to measure empirically. Murphy and Zábojník (2004) distinguish between specific and general managerial skills. In their study, they theorize that general managerial skills—which they describe as being *"transferable across companies, or even industries"*—are in higher demand among modern, complex firms. Thus, according to their model, pay should be higher for managers with general skills, as companies from all industries compete to hire them. Indeed, the literature indicates that corporate performance is positively associated to general ability of the CEO (Kaplan et al. 2012), that CEO compensation was lower during the period in which firm-specific skills were more common than general managerial skills (Frydman and Saks 2010), and that generalist managers who acquired diverse knowledge and experience through a varied lifetime work experience enjoy a higher pay than specialists (Custódio et al. 2013).

4.2.3 General Skills and Entrepreneurship

The concept of general skills is also present in the entrepreneurship literature. Lazear (2004, 2005) described entrepreneurs as jacks-of-all-trades, in the sense that they need to perform a wide range of tasks which often differ substantially in terms of the type of knowledge and ability required. Thus, even though entrepreneurs do not necessarily become specialists in any of the tasks they carry out, they must be competent on a wide variety of them. Consequently, individuals who possess a more diverse educational or professional background are more likely to become entrepreneurs, as the potential return to their balanced set of skills should be higher than in wage employment. In this sense, the literature provides substantial evidence supportive of the positive relationship between diverse background and entrepreneurial behavior (e.g. Lazear 2004, 2005; Wagner 2003, 2006).

Similarly, Elfenbein et al. (2010) argue that workers employed in smaller firms engage in more varied activities than those working for larger organizations, where tasks are more narrowly defined. This makes the former more likely to become entrepreneurs than the latter, as they gather managerial knowledge and develop more balanced skills. There is, however, an alternative explanation for the association between diversity and self-employment engagement. If would-be entrepreneurs already have an innate taste for diversity, then they would be more prone to engage in diverse training and occupations. In this sense, Silva (2007) shows that breadth of experience becomes irrelevant in a panel data setup, which would point to a selection into entrepreneurship based on unobserved characteristics, such as a preference for variety.

Whether innate or acquired, the fact that balanced skills are associated with a higher likelihood to become an entrepreneur seems to be consistent. However, it is not clear that general skills are also positively related to subsequent earnings. Åstebro and Thompson (2011) use Canadian data to show that individuals with a more diverse background are more likely to engage in entrepreneurship, but they also have lower income levels. The penalty for diversity is also present for wage employees, although to a lesser extent. Conversely, results in Bublitz and Noseleit (2014) point to a premium for a diverse background, both for entrepreneurs and for employees.

Given the mixed evidence concerning the returns to general ability, it is not easy to draw any concrete expectation as to whether entrepreneurial experience will be positively or negatively associated with subsequent earnings in managerial positions. If individuals who run their own firms tend to possess or develop a broader set of skills, then firms might interpret entrepreneurial experience as a signal of general managerial ability, and would therefore be willing to offer a higher pay in order to hire such individuals. However, while the results provided by Custódio et al. (2013) point to a premium for general managerial skills, there is a potential conflict in the concept of *general skills*. In the finance literature, general skills are usually opposed to industry-specific and firm-specific skills. Thus, general managerial skills are applicable across firms and industries, industry-specific skills are transferable across firms operating in the same industry, and firm-specific skills are only valuable in a particular firm. However, the entrepreneurship literature explains that entrepreneurs often have general skills as opposed to task-specific skills. Although similar, these two concepts refer to two different dimensions. In fact, entrepreneurial skills are not exactly the same as general managerial skills. For example, an entrepreneur may have gathered experience on a varied set of skills that he or she can only apply to his or her own company, and

that are not transferable to other firms. If this is the case, then entrepreneurial experience may no longer be a valid signal of general managerial skills.

Moreover, entrepreneurial experience might simply reflect a taste for the process of running a firm. Entrepreneurs are often willing to stay in entrepreneurship even if the wage they would receive in wage employment is potentially higher, simply because they enjoy other non-pecuniary benefits (Hamilton 2000). In fact, entrepreneurs seem to be more satisfied with their jobs because they enjoy the process of managing a firm (Benz and Frey 2008a, 2008b). If firms have the perception that candidates who were entrepreneurs before are less motivated by the potential compensation, and that their interest in mainly driven by their willingness to run a company, then they might end up offering them a lower pay.

Since there are arguments to support the idea of either a premium or a penalty caused by past entrepreneurial experience, and to the extent that this is a novel question with no previous explicit empirical evidence, I do not develop any formal hypothesis. Instead, the approach on this article is primarily empirical, although post-hoc analyses will be grounded in potential mechanisms that can be derived from previous works.

4.3 Data and Empirical Approach

4.3.1 Data

In order to estimate the effects of entrepreneurial experience on CEO compensation, I make use of register data from Danish tax authorities. This database offers two different layers of information: the individual (IDA database) and the firm (FIRM database). Thus, it allows matching managers to their companies as long as they operate in Denmark. Although firm-level data only covers the period 2000 to 2012, and hence the analysis will be limited to those years, data at the individual level is available from 1980. This makes it possible to identify the career trajectories and educational background of all the managers in the sample. That way, I can identify who was an entrepreneur in the past, for how long, how much time has passed since their last entrepreneurial spell, the industry where their ventures operated, and how much money they made.

There are a number of restrictions that were imposed during the data cleansing phase. First, to avoid particularities of firms operating in the public sector, I keep only private firms. Second, in cases where a firm had more than one CEO in a given year, I defined the top earner CEO as

the top manager.[2] This way, I avoided having multiple observations per firm in a year. Third, I excluded the cases where entrepreneurs become the managers of their own businesses. Finally, I restrict the sample to individuals becoming managers for the first time in their lives from the year 2000 onwards, in order to avoid additional noise coming from potential experiences as managers in the past. The final sample consists of 22,239 top managers and 18,192 firms, for a total of 48,616 CEO-year observations and 25,081 CEO-firm observations. The number of managers with entrepreneurial experience amounts to 4,116 (or 18.51%).[3]

Table 4.1 exhibits descriptive statistics from a wide range of individual- and firm-level characteristics for th two groups of managers—i.e. those with and without entrepreneurial experience. Both types of managers differ significantly from each other in most of the variables considered in this analysis. At the individual level, managers with entrepreneurial experience tend to receive a higher pay. The gap appears to come from equity-based compensations, rather than cash. Former entrepreneurs are older in the period observed, and are more often married. Females are more represented in the group of non-entrepreneurs, although they are still a minority among managers. In addition, non-entrepreneurs seem to have less work experience, but are better educated, more often externally hired, and have a longer tenure as CEOs in their current firms. Remarkably, former entrepreneurs tend to work more days per year, suggesting that it could play an important role in explaining the apparent premium that they enjoy in terms of CEO compensation.

Managers with and without entrepreneurial experience also differ with regard to the firms where they sort into. On average, former entrepreneurs join younger and smaller firms—both in terms of employees and sales—which are also less export intense. Although the fact that entrepreneurial managers show a preference for smaller and younger firms is in line with what previous research has found (Elfenbein et al. 2010; Sørensen and Fassiotto 2011), it is somewhat surprising that they still enjoy a higher pay, on average, given that firm size and profitability are positively related with CEO pay (Gabaix et al. 2014).

These descriptive figures suggest that both CEO and firm characteristics should be taken into account in order to analyze the effects of entrepreneurial experience on executive compensation.

[2] In IDA, managers can be identified either through the primary working position or through occupational codes based on the ISCO classification. I used the primary working position to identify managers because occupational codes are only available from 1991 onwards and, even after that year, some missing values persist. For the observations where information on occupational codes was available, the ISCO code corresponding to top managers overlapped with the definition of managers based on the primary working position in about 94% of the cases.

[3] A person is coded as being an entrepreneur when her primary working position is either a self-employed or an employer.

Next, I discuss potential ways to approach an analysis of this type, as well as potential concerns and ways to address them.

4.3.2 Empirical Approach

The goal of the analysis is to estimate the effect of past entrepreneurial experience on current CEO compensation. By taking advantage of the panel dimension of the data, I estimate the following model:

$$log(PAY_{ijt}) = \beta_1 ENT_i + \beta_2 X_{it} + \beta_3 Z_{jt} + \alpha_j + u_{ijt} \tag{4.1}$$

where $log(PAY_{ijt})$ is the natural logarithm of the pay earned by the CEO i working at firm j in the year t; ENT_i is a dummy variable that equals 1 if the CEO i had entrepreneurial experience prior to becoming a manager; X_{it} represents a series of time-varying CEO characteristics (such as experience); Z_{jt} contains a number of time-varying firm-specific characteristics; α_j represents firm fixed effects; and u_{ijt} captures any unobserved factor that could affect the outcome.

There may be various omitted characteristics of the CEOs included in u_{ijt} that could bias the estimation of the coefficient of interest (β_1) if they are correlated with ENT_i. These would be factors that simultaneously affect executive compensation and entrepreneurial propensity. Among others, ability, risk preferences, and overconfidence are all susceptible of affecting both the outcome and the explanatory variable of interest: Entrepreneurs tend to come from the tails of the ability distribution (Åstebro et al. 2011) and more able CEOs tend to receive a higher pay (Gabaix and Landier 2008); risk-taking individuals are more likely to sort into entrepreneurship (Vereshchagina and Hopenhayn 2009) while risk averse CEOs tend to demand a risk premium (Custódio et al. 2013); and overconfidence makes individuals more prone to engaging into entrepreneurship (Dushnitsky 2010; Hayward et al. 2006; Lowe and Ziedonis 2006) and can affect executive compensation through impacts on managerial style and performance (Malmendier and Tate 2005).

While a fixed-effects approach could help mitigate the potential influence of such unobserved traits, the independent variable of interest is time invariant and would therefore be omitted in the estimations. In order to perform fixed effects at the CEO level, I compute an alternative measure for entrepreneurial experience that captures how entrepreneurial a manager is relative to the median

manager in a given year. Because existing CEOs may drop their current managerial positions and exit the sample, and new CEOs can enter the sample in any year, the overall composition of the market of CEOs changes from year to year. I exploit this annual variation and classify the managers in two categories, based on whether their entrepreneurial experience is above or below the median entrepreneurial experience of all managers in that particular year.[4] This variation allows me to perform individual fixed effects estimations, thus reducing the potential impact of (time invariant) unobserved heterogeneity at the CEO level.

Furthermore, I complement the approach described above by means of instrumental variable (IV) regressions. The ideal instrument would be a variable that explains a sufficiently large share of the variation of the main independent variable (in this case, entrepreneurial experience) while affecting the outcome (CEO pay) *only* through its impact on the independent variable. In this exercise, I will use parental entrepreneurship as an instrument for entrepreneurial experience. The assumption is that, while entrepreneurial intentions are transmitted from parents to children (Lindquist et al. 2015; Sørensen 2007b), the fact that the manager's parents were entrepreneurs in the past should not directly influence the compensation that the hiring firm pays her.

Additional concerns might arise regarding the role of firm-specific heterogeneity. For example, it might be the case that former entrepreneurs are attracted to firms with steeper compensation schemes (under the assumption that entrepreneurs react more strongly to incentives), they might systematically join small and young start-ups, or perhaps they may show a preference for joining family businesses. While some of those characteristics can be directly controlled for (such as firm size and firm age), others remain unobserved in the register data. If such omitted firm characteristics are also correlated with whether the manager was an entrepreneur or not, then an endogeneity problem would happen. However, to the extent that firms appear in multiple years in the data, and because the variable of interest may vary over time across firms (i.e. is only invariant with respect to the CEO), I can tackle this particular concern by adding firm fixed-effects (α_j in equation 4.1).

[4] A similar approach is used in Custódio et al. (2013) to assess the impact of general managerial skills on CEO compensation.

4.4 Results

4.4.1 Main Results

The core set of results are exhibited in table 4.2, which presents six different models structured in six columns. Column (1) contains estimates from panel OLS regressions including controls at the CEO level. Work experience and educational achievements are positive and significant predictors of CEO pay. Being married and having children are also positively correlated, whereas females earn roughly one third less than male managers. Consistent with prior studies (e.g. Murphy and Zábojník 2004), I find that externally hired CEOs are paid higher than internally promoted ones. Finally, and as expected, CEO pay increases with days worked and tenure. In relation to the coefficient of interest, whereas basic ttests in table 4.1 suggested that managers with entrepreneurial experience earn a higher pay, the coefficient in this regression becomes negative, hinting to a positive selection of entrepreneurs.

In contrast to the first column, the specification in column (2) controls for firm-specific characteristics instead of CEO-specific attributes. Firm size and sales are positively related to CEO compensation, which is again in line with extant research (Gabaix et al. 2014).[5] In addition, executive pay is higher in export intensive and foreign firms, as well as in stock-based firms compared to private limited companies. In this model, the estimate for entrepreneurial experience becomes positive and significant. This is in line with what descriptive statistics suggested, and it seems that the pay of managers with entrepreneurial experience could be larger if it they did not sort into smaller firms with lower sales and less export intensive, since these attributes are positively correlated with executive compensation.

After including both CEO- and firm-specific controls in column (3), the effects net out and the coefficient for entrepreneurial experience becomes non-significant. However, it regains significance in column (4) after including firm fixed effects. The interpretation for the model with firm-level fixed effects is that, within each firm, executive compensation increases when the manager has entrepreneurial experience. In column (5) the included fixed effects correspond to the CEO level, by exploiting annual variation in the median number of years of experience in entrepreneurship among managers, as explained above. The coefficient is once again positive and significant. Finally,

[5] The coefficient for firm age appears negative and significant. While this might reflect that rent extraction is more common in young firms, it must be noted that an alternative specification pointed to a U-shape relationship between firm age and CEO pay. However, in order to keep the analysis simple and to minimize collinearity issues, I model the relationship as linear instead. Results were virtually identical in the alternative specification.

results in column (6) are obtained by instrumenting entrepreneurial experience with a variable that equals 1 if any of the manager's parents were entrepreneurs in the past.[6] Entrepreneurial experience—through parental entrepreneurship—positively affects CEO pay.

Taken together, results suggest that entrepreneurs receive a premium even after taking into account the potential effect of (constant) innate unobserved traits of both the firms and the managers themselves. In other words, this set of results provide causal evidence in favor of a premium for entrepreneurship. Hiring firms appear to value entrepreneurial experience and tend to overpay managers who were business owners in the past.

4.4.2 Additional Results from Split Samples

In this section I slice the data in different ways to investigate potential sources of heterogeneity that could lead to different results. In particular, I consider 4 different ways in which the premium for entrepreneurial experience might vary. Table 4.3 contains estimates pertaining to each of these alternative mechanisms.

First, inspired by the distinction that Levine and Rubinstein (2017) made between incorporated and unincorporated, I classify entrepreneurs in two categories: self-employed, and employers. While it is not exactly the same as distinguishing between incorporated and unincorporated entrepreneurs, discriminating between self-employed and employers is the closest approximation that my data allows. If incorporated (employer) entrepreneurs are of a higher profile and quality (Levine and Rubinstein 2017), and given that hiring firms pay a premium for entrepreneurial experience, then it is expected that CEOs with experience as employers enjoy a higher pay than those with only self-employment experience. In my sample, 4,198 of the 8,938 managers who were entrepreneurs in the past—almost 47% of them—have experience as employers. Results in panel A seem to support this hypothesis, as the coefficient for entrepreneurial experience is only significantly positive when the CEO had experience as an employer rather than as a self-employed.

In a sample of Danish workers drawn from the same register data, Kaiser and Malchow-Møller (2011) found that those who return to wage employment after a brief spell in entrepreneurship find a premium—instead of a penalty as was typically documented in the literature—provided that the industry of entrepreneurship and subsequent wage employment were related, and also if the venture was relatively successful. Based on their work, it should be the case that CEOs

[6] Both the Cragg-Donald ($F = 128.72$) and the Kleibergen-Paap ($F = 33.79$) statistics rejected the weak instrument hypothesis. First-stage estimations are reported in table C.1 in the appendix.

with entrepreneurial experience receive a higher pay when the industries ae related and when their ventures were successful. In panels B and C of table 4.3 I run the corresponding regressions after splitting the samples accordingly. In panel B, I split the sample based on whether the current (NACE two digit) industry where a CEO operates is the same as the industry in which the entrepreneurial spell happened. The share of former entrepreneurs who are currently working as a CEO in a related industry is 38.35%. In panel C, I separate former entrepreneurs based on whether their entrepreneurial earnings are above or below the median. In both cases, results are in line with the findings by Kaiser and Malchow-Møller (2011): the premium for entrepreneurial experience is only present when the industries are related and when the venture was successful. Importantly, however, no significant penalty is found for under-performing entrepreneurs.

Finally, I evaluate the extent to which the premium dissipates as time since the last entrepreneurial spell increases.If hiring firms are willing to pay a higher price for entrepreneurial managers because they believe that former entrepreneurs have a certain type of human capital that makes different from—and more valuable than—the rest of the candidates, and to the extent that human capital may deteriorate over time due to a lack of practice, then it can be theorized that the longer the period since the last time a manager was a CEO, the smaller the premium. Once again, I split the sample in two categories and perform an analysis in both samples. Results in panel D confirm the above reasoning, as the premium is only significantly different from zero for the case of managers whose last entrepreneurial spell occurred no more than five years ago, although in this occasion the significance is less strong and the difference between the two coefficients is minimal.

To sum up, managers with entrepreneurial experience seem to benefit from it even after accounting for observed and unobserved heterogeneity at the individual and firm levels, which may reflect that their status of former entrepreneurs is a useful signal of managerial ability that attracts the attention of hiring firms. However, having a history of entrepreneurial experience per se does not grant a premium, as the executive compensation seems to depend on whether the business was relatively successful, whether it occurred in a related industry and not too long ago, and is only present for former employers rather than self-employed. This reflects that hiring firms are rational and are not willing to offer a higher pay to managers for *any* entrepreneurial experience.

4.5 Conclusion

The relentless growth of managerial compensation levels over the last decades has captured the attention of both scholars and policy makers, and numerous alternative explanations have been provided in the quest to understand what drives CEO pay. From firm- to manager-specific characteristics, the literature has explored a wide range of factors that drive executive compensation (Agarwal 1981). At the firm-level, aspects such as size (Gabaix et al. 2014) or profitability (Jensen and Murphy 1990) have been extensively studied. At the CEO level, most of the attention has been paid to the fact that small differences in skill and ability explain a large part of the variation in the levels of executive pay (Gabaix and Landier 2008).

Because talent and ability are difficult to measure and often remain unobservable, scholars have used different proxies such as prior stock performance (Fee and Hadlock 2003) or media coverage (Falato et al. 2015). Others have distinguished between general and specific managerial ability (Murphy and Zábojník 2004). The reasoning is that, in the context of a market with increasingly large and complex firms, general skills have become more demanded. Because generalists have skills that are transferable across firms and industries, they are less likely to run out of options than specialists, and hence have more bargaining power with regard to interested firms compared to specialists. Empirical evidence does support the notion that generalist CEOs get a higher pay than specialists (Custódio et al. 2013).

However, the role of entrepreneurial experience has been overlooked by the literature thus far. Entrepreneurs are often regarded as a special group of individuals, who differ from both employees and managers in the way they face potential risks, losses, and uncertainty (Koudstaal et al. 2015). Moreover, the human capital that entrepreneurs possess tends to be different from that of paid employees, in the sense that they tend to develop a more diverse set of skills and knowledge as a consequence of both the more varied nature of the entrepreneurial occupation (Lazear 2004) and their innate preference for diversity (Silva 2007). In addition, entrepreneurship is not a predominant occupation (Wagner 2006), which means that having entrepreneurial experience is a rare feature. Therefore, it is plausible to think that this type of experience may have an impact on executive compensation.

This paper provides the first set of empirical evidence to support that view. Results from a sample of managers and companies in Denmark suggest that executives with entrepreneurial

experience are in fact regarded differently by firms operating in the market for CEOs. Even though they are more likely to sort into smaller and younger firms with lower levels of sales and export intensity, former entrepreneurs receive a higher compensation compared to managers who never were entrepreneurs in the past. Judging by the fact that the effect remains positive despite controlling for a wide range of firm and individual characteristics, and even after addressing endogeneity concerns, it appears evident that a history of entrepreneurial experience is regarded as valuable by hiring firms, which tend to be willing to pay an excessive compensation in order to attract individuals with this type of skills and experience. However, the premium is only present in certain circumstances, such as when the entrepreneurial spell was successful, and happened recently in a related industry, which suggests that having been an entrepreneur in the past is not a sufficiently strong signal for potential hiring firms.

Finally, this study may open new venues for future research. One way in which this investigation can be taken a step further is by investigating what exactly are the skills that make entrepreneurs more valuable for firms searching for a manager. Managerial styles have the potential to affect firm performance and, consequently, executive compensation (Bertrand and Schoar 2003; Schoar and Zuo 2016). It could be the case that entrepreneurs run firms differently, but also that their particular style and knowledge is more valuable depending on the status of the hiring company. For example, mature firms are more likely to hire financial experts (Custódio and Metzger 2014) while managers with a diverse career background are more demanded in situations in which internal capital is insufficient (Hu and Liu 2015). Hence, exploring in which circumstances entrepreneurial experience becomes more demanded can be done from multiple perspectives, and I encourage researchers to further develop the extant knowledge on this matter.

Table 4.1: **Descriptive statistics**

	Non entrep.		Former entrep.		Difference	
	Mean	S.D.	Mean	S.D.		
CEO characteristics						
Total pay	576.15	1,064.776	640.86	871.17	−64.70	***
Cash pay	539.86	515.29	562.55	568.88	−22.69	***
Equity pay	35.29	870.52	77.31	598.97	−42.02	***
Age	39.97	8.29	43.79	9.79	−3.82	***
Female	0.23	0.42	0.14	0.34	0.09	***
Married	0.65	0.48	0.70	0.46	−0.51	***
Number of children	1.22	1.07	1.15	1.01	0.07	***
Bachelor degree	0.32	0.47	0.26	0.44	0.06	***
Masters degree	0.20	0.40	0.18	0.38	0.02	***
Years of experience	15.60	8.78	19.28	8.90	−3.67	***
CEO tenure in current firm	1.98	1.36	1.92	1.27	0.06	***
Externally hired	0.42	0.49	0.41	0.49	0.01	**
Days worked a year	314.04	103.93	315.56	106.41	−1.52	
North Denmark	0.09	0.29	0.09	0.30	−0.00	
Central Denmark	0.23	0.42	0.23	0.42	−0.00	
Southern Denmark	0.21	0.41	0.18	0.38	0.03	***
Capital region	0.34	0.48	0.36	0.48	−0.02	***
Zealand	0.12	0.33	0.14	0.34	−0.01	***
Firm characteristics						
Firm age	18.49	17.71	13.63	13.50	4.86	***
Number of employees	89.47	399.79	55.15	455.84	34.32	***
Sales	172,234	1,233,805	96,329	838,349	75,905	***
Export intensity	0.27	0.39	0.18	0.33	0.09	***
Foreign firm	0.01	0.12	0.01	0.09	0.01	***
Stock-based company	0.57	0.49	0.51	0.50	0.06	***
Private limited company	0.20	0.40	0.32	0.47	−0.13	***
Other business forms	0.23	0.42	0.17	0.37	0.06	***
Number of observations (N, %)	39,678	81.62%	8,938	18.38%		
Number of managers (N, %)	18,123	81.49%	4,116	18.51%		

Notes. All monetary figures expressed in thousands of DKK from the year 2000.

Table 4.2: **Main results: Effects of entrepreneurial experience on CEO pay**

CEO pay (log)	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	IV (6)
Entrep. experience	−0.027**	0.052***	−0.003	0.045*	0.125**	1.128***
	(0.013)	(0.013)	(0.013)	(0.024)	(0.053)	(0.365)
Work experience	0.006***		0.009***	0.006***	0.025	0.001
	(0.001)		(0.001)	(0.001)	(0.017)	(0.002)
Female	−0.308***		−0.292***	−0.235***		−0.156***
	(0.010)		(0.010)	(0.022)		(0.032)
Married	0.124***		0.119***	0.123***	0.165***	0.102***
	(0.011)		(0.011)	(0.016)	(0.024)	(0.015)
Number of children	0.028***		0.027***	0.012	−0.001	0.014***
	(0.004)		(0.004)	(0.008)	(0.008)	(0.006)
Bachelor degree	0.166***		0.153***	0.086***		0.096***
	(0.011)		(0.010)	(0.022)		(0.192)
Masters degree	0.374***		0.345***	0.154***		0.117***
	(0.014)		(0.014)	(0.029)		(0.025)
CEO tenure	0.021***		0.016***	−0.035***	0.023***	−0.030***
	(0.003)		(0.003)	(0.005)	(0.006)	(0.004)
Externally hired	0.051***		0.050***	0.037**	0.089***	0.026**
	(0.009)		(0.009)	(0.015)	(0.018)	(0.013)
Days worked	0.001***		0.001***	0.001***	0.001***	0.001***
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
Firm age		−0.001***	−0.001***	0.034***	−0.002***	0.034***
		(0.000)	(0.000)	(0.007)	(0.001)	(0.007)
Employees (log)		0.079***	0.068***	0.038**	0.038***	0.045***
		(0.005)	(0.005)	(0.016)	(0.009)	(0.014)
Sales (log)		0.011***	0.016***	0.010	0.012**	0.008
		(0.004)	(0.003)	(0.009)	(0.006)	(0.008)
Export intensity		0.160***	0.150***	0.007	0.082***	0.008
		(0.017)	(0.017)	(0.037)	(0.029)	(0.032)
Foreign firm		0.067	0.132***	0.138***	0.045	0.007
		(0.046)	(0.044)	(0.043)	(0.064)	(0.059)
Stock-based firm		0.126***	0.085***	−0.044	0.074***	−0.002
		(0.013)	(0.012)	(0.051)	(0.027)	(0.047)
Other business forms		0.084***	0.015	−0.154**	0.051	−0.273
		(0.016)	(0.015)	(0.066)	(0.034)	(0.169)
Firm fixed effects	No	No	No	Yes	No	Yes
CEO fixed effects	No	No	No	No	Yes	No
Observations	48,616	48,616	48,616	48,616	48,616	48,616

Notes. Entrepreneurial experience is instrumented with parental entrepreneurship in column (6). All models include region, year, and industry dummies. The baseline category for business form is Private limited company. Robust standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4.3: **Main results: Effects of entrepreneurial experience on CEO pay**

Panel A: Type of entrepreneurial experience		
	Self-employed vs. non-entrepreneurs	Employers vs. non-entrepreneurs
Entrepreneurial experience	0.012	0.116**
	(0.028)	(0.045)
Observations	44,418	43,876
Panel B: Relatedness of entrepreneurship industry		
	Unrelated to current industry	Same as current industry
Entrepreneurial experience	−0.013	0.245***
	(0.027)	(0.052)
Observations	45,188	43,106
Panel C: Relative entrepreneurial success		
	Below median entrepreneurial earnings	Above median entrepreneurial earnings
Entrepreneurial experience	−0.178	0.225***
	(0.027)	(0.048)
Observations	45,155	43,139
Panel D: Years spent since the last entrepreneurial spell		
	More than 5 years	5 years or less
Entrepreneurial experience	0.039	0.069*
	(0.032)	(0.037)
Observations	43,986	44,308

Notes. Regressions control for CEO and firm characteristics, and include firm fixed-effects as well as region, year, and industry dummies. Robust standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix C

Table C.1: **First-stage estimates of CEO pay**

DV: Entrepreneurial experience (0/1)	β	s.e.
Parental entrepreneurship	0.037***	(0.006)
Work experience	0.005***	(0.006)
Female	−0.074***	(0.007)
Married	0.020***	(0.005)
Number of children	−0.003	(0.002)
Bachelor degree	−0.012*	(0.007)
Masters degree	0.031***	(0.009)
CEO tenure	−0.004*	(0.002)
Externally hired	0.009	(0.005)
Days worked	0.000	(0.000)
Firm age	−0.001	(0.003)
Employees (logs)	−0.007	(0.005)
Sales (logs)	0.001	(0.002)
Export intensity	−0.002	(0.010)
Foreign firm	0.163***	(0.016)
Stock-based firm	−0.039**	(0.016)
Other business forms	0.102	(0.111)
Constant	0.168**	(0.085)
Region dummies	Yes	
Industry dummies	Yes	
Year dummies	Yes	
Number of observations	48,616	

Notes. Robust standard errors reported in parentheses. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

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