

Ability or Finances as Constraints to Entrepreneurship?

Evidence from Survival Rates in a Natural Experiment *

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Abstract: This study exploits a natural experiment to investigate why financial constraints appear to limit firm formation. Exogenous variation in wealth results from unexpected inheritance due to sudden death and allows us to identify 304 *constrained entrepreneurs*, who start a business after receiving windfall wealth. We compare the performance of these ventures to that of a matched sample of individuals who form businesses at the same time to test whether financial barriers to entrepreneurship are caused by market failure or low entrepreneurial ability. We find that constrained entrepreneurs' ventures have significantly lower survival rates and are less profitable than are those of unconstrained entrepreneurs. Collectively, these results suggest that constrained entrepreneurs have lower entrepreneurial ability and that capital markets work sufficiently well in funding individuals who have worthy entrepreneurial projects.

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I. Introduction

Entrepreneurship plays an important role in job creation and economic growth (King and Levine, 1993a, 1993b). Because of the positive externalities that accompany entrepreneurship, many countries have established policy programs and agencies directly aimed at encouraging entrepreneurship. One of the most cited impediments to entrepreneurship is financial or liquidity constraints.¹ If financial barriers are binding, low-wealth households will be constrained from starting their own business, resulting in less entrepreneurial activity and, thus, lower economic growth. In this study we provide an alternative, but unexplored, explanation for the existence of apparent financial constraints to entrepreneurship. We conjecture that well-functioning capital markets would only impose such constraints on entrepreneurs with low ability. Exogenous variations in wealth result from unanticipated inheritance due to sudden death and allow us to identify constrained entrepreneurs, who start a business after receiving windfall wealth. Our results reveal that constrained entrepreneurs perform significantly worse than do unconstrained entrepreneurs. Collectively, these results suggest that constrained entrepreneurs have lower entrepreneurial ability and that capital markets appear to work sufficiently well in funding individuals who have worthy entrepreneurial projects.

Prior literature provides evidence consistent with the existence of financial constraints by documenting a positive correlation between individual wealth and the propensity to become an entrepreneur (Evans and Jovanovic, 1989; Evans and Leighton, 1989; Fairlie, 1999; Quandrini, 1999; Gentry and Hubbard, 2001). Holtz-Eakin, Joulfaian, and Rosen (1994b) and Blanchflower and Oswald (1998) furthermore show that the

¹ Surveys of current and aspiring entrepreneurs suggest that obtaining financing is one of the principal hurdles to forming and growing new businesses (Blanchflower and Oswald, 1998). Not surprising, access to financing is high on the policy agenda around the world. In the United States, for example, the Small Business Administration has, since 1954, delivered millions of loans and guarantees to bank loans to facilitate the financing of small businesses. Many OECD countries are also encouraging entrepreneurship through easing access to financing (see OECD [2010] for an overview of policies across countries).

propensity to start a business responds positively to inheritance and gifts received in the past. Survey evidence also suggests that raising financing is the principal problem for both current and potential entrepreneurs (Blanchflower and Oswald, 1998).

In considering this line of work, the question of why potential entrepreneurs face liquidity constraints is natural. If capital markets function well, then one would expect financing of able entrepreneurs, either by financial intermediaries, family, or friends. A simple, but unexplored, explanation for the apparent liquidity constraints is lack of entrepreneurial ability. That is, low-wealth individuals are likely to be low-ability entrepreneurs with inferior business plans that face difficulties in obtaining financing. The cause of the uncovered barrier to firm formation might, therefore, be low entrepreneurial ability rather than access to financing. To this end, we exploit one of nature's own experiments to examine the underlying cause of what appears to be financial constraints to firm formation.

We identify *constrained* entrepreneurs, using windfall wealth from unexpected inheritance due to sudden death. In total we identify 304 beneficiaries who start a business after receiving windfall wealth. We find a significantly higher propensity to start a business among beneficiaries than within a matched sample of individuals with similar characteristics who do not receive windfall wealth. Absent windfall wealth, the expected number of entrepreneurs is 150. This difference bolsters our identification strategy as the average *constrained* entrepreneur appears to have faced financial constraints to entrepreneurship. Rather than focusing exclusively on the propensity to start a business, we follow the start-ups and examine their future survival rates and performance. The counterfactual in our assessment of performance is entrepreneurs who start their businesses with the same initial wealth (excluding inheritance) and individual characteristics as the treated entrepreneurs. Intuitively, it follows that if the *constrained*

entrepreneurs are characterized by lower entrepreneurial ability, their future income and survival rates should be significantly lower than those of the control group.

Our result reveals that survival rates of constrained entrepreneurs are significantly lower than in the matched sample. After one year, only 64.1% of the constrained entrepreneurs, compared with 75.0% of the matched sample, stay in business. We find similar results when survival rates are evaluated over longer horizons. After 5 years, only 41.9% of the constrained entrepreneurs, as compared with 50.0% in the control group, remain in business. Using a proportional hazard model, we show that the failure rates are significantly higher for constrained entrepreneurs while controlling for a wide array of individual characteristics.

The lower survival rates of constrained entrepreneurs strongly contrast with the fact that their relatively higher wealth provides a stronger cushion against economic shocks. Because of unexpected inheritance, constrained entrepreneurs, on average, possess DKK 1,005,200 (EUR 134,900) of wealth when they form their businesses, as compared to only DKK 98,800 (EUR 13,300) for entrepreneurs in the matched sample. Absent differences in entrepreneurial ability, we would therefore expect constrained entrepreneurs to stay in business *longer* than the matched sample of unconstrained entrepreneurs. To gauge the potential differences in performance that relate to differences in entrepreneurial ability, we also compare the performance of constrained entrepreneurs to a matched sample of entrepreneurs who start a business with the same wealth, including inheritance. The only observable difference between the treatment and control group is, thus, that wealth was inherited in the latter. Any difference in performance can therefore be attributed to differences in entrepreneurial ability. Not surprisingly, we find slightly larger underperformance when we match on post-inheritance wealth.

One possible explanation for the lower survival rates is that constrained entrepreneurs might be willing to accept riskier ventures than unconstrained

entrepreneurs because of the windfall. We therefore examine how profitable the ventures are. We find that constrained entrepreneurs' ventures are less profitable than those of unconstrained entrepreneurs. The average personal income is 5% to 20% lower in constant 2000 Danish kroner (DKK) for constrained entrepreneurs than for the matched sample over the first five years after establishment. Constrained entrepreneurs have a personal before-tax income of DKK 158,900 in the year in which they select into entrepreneurship, compared to DKK 200,700 in the year before receiving windfall wealth. This decrease in income is significantly worse than for those in the matched sample. Although income increases over time, the increase is larger for the matched sample. The significantly lower personal income is driven by lower entrepreneurial income. Using the panel structure of the data and focusing on income from entrepreneurship, we show that the average yearly underperformance for constrained entrepreneurs equals around DKR 65,000, which is equivalent to 32% of their pre-entrepreneurship income. Even among surviving entrepreneurs we find lower income for constrained entrepreneurs. The significantly lower entrepreneurial income suggests that the low survival rates cannot be explained by higher risk-taking among entrepreneurs who inherit wealth.

We also examine the contention that inherited wealth might negatively affect entrepreneurial effort. If entrepreneurship is a luxury good, performance is likely to be negatively affected by the windfall. Alternatively, the sudden death of a parent might cause grief, traumatize the beneficiary and, thus, possibly affect the future performance of the venture. We perform an out-of-sample test of the viability of this alternative interpretation by analyzing the performance of beneficiaries who are already entrepreneurs when their parents suddenly pass away. As these individuals were able to start their business absent windfall wealth, their performance should be identical to a matched sample of unconstrained entrepreneurs, i.e., unless their performance is negatively affected by the sudden death of their parents. However, we find no evidence indicating that inherited

wealth negatively affects their performance. If anything, inherited wealth seems to temporarily postpone closure of unprofitable ventures.

An alternate interpretation of our results is that the difference between the performance of constrained and unconstrained entrepreneurs might relate to access to valuable advice for the latter group. In particular, banks and financial intermediaries might bundle start-up financing with advisory roles that could positively affect the probability of survival. Although such advice is unlikely to be given for free (and most likely will be recovered by interest rate margins on loans), access to advice will positively bias our assessment of differences in entrepreneurial abilities. However, we note that a sufficient condition for our interpretation of the results is that banks and financial intermediaries, on average, are able to screen the ability of potential entrepreneurs. We also note that we find similar results when we match on i) post-inheritance wealth, or ii) parental wealth, under which condition the ability of unconstrained entrepreneurs to start their venture without external financing (and advice) is higher.

Our study contributes to the literature along several lines. First, to the best of our knowledge, this study is the first to investigate the extent to which financial constraints are imposed because of market failure or low entrepreneurial ability. Our approach differs from Holtz-Eakin, Joulfaian, and Rosen (1994b) and Blanchflower and Oswald (1998) in that we focus on unanticipated windfalls and use the windfall to identify constrained entrepreneurs among the beneficiaries.² Second, we follow the *constrained* entrepreneurs and compare their performance to a matched control sample, rather than focusing on the propensity to become an entrepreneur. We thereby test the premise behind the policies that facilitate access to financing: that important frictions in the capital markets preclude

² Holtz-Eakin, Joulfaian, and Rosen (1994b) analyse the effect of inherited wealth on the performance of existing entrepreneurs (i.e. beneficiaries who already are self-employed). Consistent with the importance of liquidity constraints to entrepreneurship they find that entrepreneurs who inherit have higher survival rates and higher income. We find similar results when we analyze entrepreneurs who inherit, but note that the effect of inherited wealth declines over time.

entrepreneurs with good ideas from starting a new business. Third, we show that the effect of windfall wealth on entrepreneurship persists when we exclude entrepreneurial estates. Thus, our results are not confounded by concerns related to inherited businesses. Last, our study also contributes to the ongoing policy debate by questioning the welfare gains from promoting entrepreneurship among constrained individuals. Although subsidization of constrained entrepreneurs will lead to firm formation, these entrepreneurs have lower survival rates and are less profitable than non-constrained entrepreneurs. The low ability of constrained entrepreneurs will reduce the likelihood that positive externalities of entrepreneurship on growth will materialize. In addition, the results suggest that capital markets work sufficiently well by screening out individuals with low entrepreneurial ability, and funding individuals with worthy projects.

Our results, however, do not imply that all individuals with worthy projects will obtain financing. Frictions in the capital markets might prevent some entrepreneurs with good projects from starting a new business, and lenders might find it optimal to impose capital rationing. Local banking monopolies might limit the access to financing for start-ups and subsequently distort entrepreneurship as documented by Kerr and Nanda (2009, 2010). Our results also do not preclude the prevalence of lender discrimination against certain individuals. Related to these issues, our results do point out that the rationale for initiatives to promote wider entrepreneurship should focus on eliminating the cause of these frictions (e.g., capital rationing) or discrimination rather than providing broad access to financing. In the former case, welfare gains are more likely to materialize because the welfare gains in the latter case will be hampered by the low entrepreneurial ability among the group of financially constrained individuals who are aspiring entrepreneurs.

The rest of the study is as follows. Section II describes the motivation and background of the study. Section III outlines our data and presents summary statistics and

our empirical strategy. Section IV presents the results, and Section V gives some alternative interpretations. Section VI concludes.

II. Motivation and background

One of the most debated barriers to firm formation is the inability of aspiring entrepreneurs to raise capital. The inability of these entrepreneurs to finance their entrepreneurial projects is referred to as liquidity or borrowing constraints. If financial constraints are binding, low-wealth households should have a lower propensity to become entrepreneurs. Consistent with the existence of financial constraints, many empirical papers have found positive correlation between wealth and the propensity to start a business (Evans and Jovanovic, 1989; Evans and Leighton, 1989; Fairlie, 1999; Quandrini, 1999; and Gentry and Hubbard, 2001). While the correlation between wealth and entrepreneurship appears to be strong, a common critique is that wealth might capture individual heterogeneity rather than liquidity constraints. To avoid the potential problem of endogeneity, several studies have instrumented wealth using inheritance or gifts received in the past (Holtz-Eakin, Joulfaian, and Rosen, 1994b; Blanchflower and Oswald, 1998). Hurst and Lusardi (2004) further argue that the receipt of an inheritance is not a random event. In particular, they point out that family succession is prevalent among private firms, and that strong intergenerational correlation exists in educational, occupational, savings, and wealth preferences.³ Inherited wealth might therefore capture transfers of businesses across generations or the different entrepreneurial propensities of wealthy families. To address this issue, Hurst and Lusardi (2004) propose an alternative instrument based on capital gains on housing, and find little evidence in favor of liquidity

³ For instance, Altonji and Dunn (2000) and Charles and Hurst (2003) document strong intergenerational correlation in occupation, education, wealth, and saving preferences.

constraints. While this approach is clever, the key assumption is that individuals are both willing and able to borrow against their housing wealth.

In this study we draw inspiration from this line of work and extend the inquiry by using unexpected inheritance from sudden deaths to generate unanticipated wealth shocks to beneficiaries. Our detailed data further allow us to alleviate the concerns raised by Hurst and Lusardi (2004). We show that inherited wealth has a positive correlation with business formation even when controlling for generational transfers of businesses and family wealth. While this result seems to support the general view that financial constraints are an important barrier to entrepreneurship, our key contribution is to question this interpretation. If the capital market functions well, it should be willing to finance able entrepreneurs. Consequently, in the absence of market failures, aspiring entrepreneurs facing financing constraints are likely to be less able entrepreneurs. The binding barrier might therefore be entrepreneurial ability rather than lack of liquidity. To test this hypothesis, we use the setting of a natural experiment and follow new businesses over time. We use windfall wealth that results from unanticipated inheritance due to sudden death to identify *constrained* entrepreneurs (i.e., individuals who become entrepreneurs after receiving windfall wealth) and assess their performance in relation to a matched sample of *unconstrained* entrepreneurs (i.e., individuals with similar characteristics who became entrepreneurs in the same period but who did not receive windfall wealth). It follows that if the nature of the constraint relates to entrepreneurial ability, we should expect lower performance among *constrained* entrepreneurs. Financial constraints, on the other hand, predict little difference in performance between the treated individuals and the control group.

III. Nature's own Natural Experiment: Windfall Wealth from Unexpected

Inheritance due to Sudden Death

In this study we exploit exogenous variation in individual's wealth to examine whether entrepreneurs face liquidity constraints because of low entrepreneurial ability. Exogenous variation in wealth is derived from a natural experiment, in which individuals receive windfall wealth due to the sudden death of their legal parents. As most individuals have legal parents, the natural experiment induces no selection of individuals, except as concerns the death event. Thus, for this identification strategy to work, the death has to be unexpected and sudden. Sudden deaths are medically defined as an unexpected death that occurs instantaneously or within a few hours of an abrupt change in the person's previous clinical state.⁴ As sudden death is a random draw by nature, inheritance due to sudden death is a natural experiment that induces exogenous variation in individual's wealth. To this end, we have assembled a unique dataset from Denmark that allows us to identify windfall wealth from unexpected inheritance and relate it to entrepreneurial activity.

In addition to micro data from administrative registers, the Danish case also provides us with a legal environment that eases the identification of estates and their heirs. We focus exclusively on inheritance cases of estates where all beneficiaries are offspring (i.e., where the suddenly deceased was a widow or widower, or in rare cases, a couple). We refer to these cases as terminations of households. This designation simplifies the analysis, as children, according to the Danish Inheritance Law of 1964, will inherit by default the estate in proportional shares in all such cases. The default sharing rules can only partially be offset by the existence of a will that by Danish law must be publicly available before

⁴ For instance, the American Academy of Paediatrics defines sudden cardiac death as a non-traumatic, nonviolent, unexpected event resulting from sudden cardiac arrest within 6 hours of a previously witnessed state of normal health.

the death. Although opting out in spiteful wills is possible in Denmark, the inheritance law ensures that children will inherit at least 50% of the estate in the cases we consider. Moreover, opting out of the default sharing rule is extremely rare, as only 2% of the empirically relevant individuals in Denmark have drafted a will (Ret og Råd, 2008). Consequently, the net wealth of the estates in our sample is divided equally among the offspring.

Identification of estates is facilitated by the institutional environment. Danish law requires that a death certificate be issued by a doctor when a citizen dies. If the person dies at home, the death certificate is filled out by the personal doctor or the emergency doctor on duty (*Lægevagten*). If the person dies in the hospital, a doctor at the hospital will issue the death certificate. Danish law further obliges the relatives to report the death to their local funeral authority within two days. The funeral authority formally notifies relevant government agencies, including the Central Office for Personal Registration (*CPR Registeret*) and the probate court (*Skifteretten*), which supervises the process that transfers legal title of property from the decedent's estate to her beneficiaries. Skifteretten immediately seizes the decedent's assets, with the purpose of meeting liabilities, and transfers the net worth to the beneficiaries according to the sharing rule established by the inheritance law. By law, the transfer of the decedent's estate has to be finalized within 12 months of the death. The net worth of the estate is subject to a 15% estate tax for offspring if the estate's net wealth exceeds DKK 191,000 (EUR 25,638) in 1998. This threshold is inflated by a price index in subsequent years. The estate is subject to an additional 25% inheritance tax for people who are not immediate family members of the deceased (i.e., the inheritance cases we omit in this study).

A. Data Sources

We construct a dataset with 19,329 individuals who unexpectedly inherited wealth due to the sudden death of their legal parents in the period from 1995 to 2001. Our dataset contains economic, financial, and personal information about the individuals, as well as their deceased parents. We derive data from five different sources made available through Statistics Denmark; the sources are:

1. Individual and family data from the official Danish Civil Registration System (*CPR Registeret*). These records include individuals' personal identification number (*CPR*), name, gender, date of birth; the names and CPR numbers of nuclear family members (parents, siblings, and children); and individuals' marital history (number of marriages, divorces, and widowhoods). We use these data to identify all individuals' legal parents. The sample contains the entire Danish population and provides a unique identifying number across individuals, households, and time.

2. Causes of deaths from the Danish Cause-of-Death Register at the Danish National Board of Health (*Sundhedsstyrelsen*). This dataset classifies the cause of death accordingly to international guidelines specified by the World Health Organization's International Classification of Diseases (ICD-10) system.⁵ The source of this data is the official death certificates that are issued by a doctor immediately after the death of Danish citizens. The death certificate details the cause of death based on post-mortem examination reports and information on social and psychiatric history provided by family members and associates. Because the death certificate and the post-mortem examination report are carried out by a doctor, the classification conveys a medically qualified opinion on the cause of death. Sundhedsstyrelsen compiles this data for statistical purposes and makes it available for medical and social science research through Statistics Denmark. We have obtained the

⁵ WHO's International Classification of Diseases, ICD-10, is the latest in a series that has its origin in the 1850s. The first edition, known as the International List of Causes of Death, was adopted by the International Statistics Institute in 1893. WHO took over the responsibility of ICD at its creation in 1948, and the system is currently used for mortality and morbidity statistics by all Member States. The current ICD-10 standard came into use by Member States in 1994.

cause of death from all Danish citizens who passed away between 1995 and 2007. We use this dataset to construct a sample of individuals who died suddenly and unexpectedly.

3. Employment data from Statistics Denmark's IDA database. Employment data are based on filings from firms and public agencies in the last week of November each year. From these filings we obtain the employment status of all individuals by their CPR number. For employed individuals, the data also contain information about the type of employment, whereas for the unemployed, the data provide information about the duration of unemployment. The employment data cover the period from 1990 to 2007. We use this dataset to identify whether individuals become, and survive as, entrepreneurs. We follow prior literature and define entrepreneurs as self-employed (Evans and Jovanovic, 1989; Evans and Leighton, 1989; Holtz-Eakin, Joulfaian, and Rosen, 1994a; Holtz-Eakin, Joulfaian, and Rosen, 1994b; Blanchflower and Oswald, 1998, Fairlie, 1999; Quandrini, 1999; Gentry and Hubbard, 2001; and Hurst and Lusardi, 2004). In addition, the data allow us to check whether individuals' parents are entrepreneurs and, thereby, to control for differences in entrepreneurial propensities and possible inheritance of businesses.

4. Income and wealth information from the official records at the Danish Tax and Customs Administration (*SKAT*). This dataset contains personal income by CPR numbers and wealth information on the Danish population. SKAT receives this information directly from the relevant sources: employers supply statements of wages paid to their employees. Financial institutions supply information to SKAT on their customers' deposits, interest paid (or received), security investments, and dividends. Because taxation in Denmark mainly occurs at the source level, the income and wealth information are highly reliable. Through Statistics Denmark, we have obtained access to personal income and wealth data from 1990 to 2007.

5. Education records from Danish Ministry of Education. All completed (formal and informal) educations are registered on a yearly basis and made available through Statistics Denmark. We use these data to measure individuals' education levels.

Taken together, these data sources allow us to identify unexpected inheritance that has left windfall wealth to beneficiaries in the period between 1995 and 2007. Our analysis will, however, focus on individuals who inherit in the period from 1995 to 2001, leaving a five-year evaluation period after firm formation to assess the outcome of the ventures.

B. Data Construction

To identify individuals whose parent dies, we link the data on cause of death to the family data by CPR numbers. The starting point of our analysis is deceased parents who cause a termination of the household. Terminations of households occur whenever i) the last living parent dies, or ii) both parents die within the same calendar year. In total we have identified 83,602 terminations of households between 1995 and 2001. Panel A in Table I shows the distribution across time. From this sample we identify the cause of death with the purpose of selecting a sample of household terminations resulting from sudden and unexpected death. Panel B details the cause of death based on WHO's ICD-10 codes.

To identify sudden and unexpected deaths we rely on a medical literature that defines sudden death as unexpected and non-traumatic death that occurs instantaneously or within a few hours of an abrupt change in the person's previous clinical state. The identification of relevant ICD-10 codes relies on related medical literature as well as a thorough inspection of WHO's detailed classification system.⁶ The medical literature distinguishes between natural (due to disease) and unnatural deaths (accidents and violence). Among natural deaths, we consider acute myocardial infarction (ICD-10: I22-

⁶ See WHO's webpage at www.who.int/classifications/icd/en.

I23), cardiac arrest (I46), congestive heart failure (I50), stroke (I60-I69), and sudden deaths by unknown causes (R95-R97) as sudden deaths. Among unnatural deaths, traffic accidents (V00-V89) and other accidents and violence (V90-V99, X00-X59, and X86-X90) are unanticipated by the relatives. The latter category excludes suicide or violence by subjects related to the deceased. Panel B tabulates the number of deaths for each type of sudden death, whereas Panel C shows the total number per year. In total, we identify 12,068 terminations of households due to sudden deaths from 1995 to 2001.

The final step in our sample selection is to link the deceased to their beneficiaries. On average, each terminated household had 1.61 beneficiaries (i.e., children), expanding our sample size to 19,329 individuals who experience a wealth windfall due to the sudden deaths of their parents. As all our data sources include the individuals' social security numbers (CPR), all individual characteristics of the beneficiaries can be identified by linking their information through the CPR number.

Table II presents summary statistics of our final sample of beneficiaries. As the main focus of the study is to identify individuals who become entrepreneurs after receiving windfall wealth, we split our sample into pre-shock entrepreneurs and non-entrepreneurs. For each individual, we report income, wealth, age, gender, education, and marital status for the year prior to their parents' sudden death. Income and wealth are indexed to constant 2000 Danish kroner. In our sample, 5.8% of the beneficiaries (1,123 individuals) were already entrepreneurs.⁷ In keeping with prior literature, Table II shows that entrepreneurs have significantly higher income and wealth, are older, and tend to be male. Table II also reports the size and distribution of windfall wealth. On average, beneficiaries receive a windfall of 228,800 DKK (30,700 EUR). Inherited wealth is also quite liquid. The deceased parents hold, on average, around half of their wealth in financial assets

⁷ On average, 8% of the workforce in Denmark is self-employed. Our beneficiaries are significantly younger than the average individual in the workforce. Becoming self-employed is positively correlated with age, experience, and wealth. We therefore have a lower fraction of self-employed (5.8%) among beneficiaries when they inherit.

(bank account, bonds, and stocks). The windfall is economically important, as it is almost twice as large as the average pre-inheritance net wealth of 133,900 DKK (17,900 EUR). The distribution of inherited wealth has substantial variation. One quarter of the beneficiaries inherit nothing, while individuals in the fourth quartile of the distribution of inherited wealth on average receive a windfall of 859,600 DKK (115,500 EUR). Pre-shock non-entrepreneurs inherit, on average, 220,400 DKK (29,600 EUR), which is equivalent to 1.04 years of before-tax income, or 1.87 times the pre-shock net wealth. Thus, the size of windfall appears large enough to provide sufficient financial cushion for aspiring entrepreneurs to start their own businesses.

C. Empirical Strategy

To test the effect of windfall wealth on entrepreneurial activity, we estimate the difference in entrepreneurial activity around the parent's sudden death. This approach is attractive because it effectively controls for time-invariant individual characteristics that are likely to impact the decision to become and be an entrepreneur. As our main interest is to understand the startup decision and the survival rates of new entrepreneurs, we focus solely on individuals who were not self-employed before the event. To control for time trends, we compare the treatment group to a control group of individuals with the same characteristics who do not receive windfall wealth. Our control group is a matched sample of individuals of the same age, gender, and education level, as well as from the same quintile of both income and wealth distribution, as the treated individual. For this control group, we calculate the fraction of individuals who become entrepreneurs, which represent the expected entry into entrepreneurship without the wealth windfall for our inheritance sample. This approach provides us with a difference-in-differences estimate of the effect of windfall wealth on becoming an entrepreneur. A positive effect of windfall wealth is expected if aspiring entrepreneurs face liquidity constraints.

A positive effect of windfall wealth might, as noted by Hurst and Lusardi (2004), occur because individuals inherit a business from their parents. To address whether prior evidence on the link between inherited wealth and entrepreneurship is caused by inheritance of businesses, we check whether the deceased parent was an entrepreneur. Our first approach is to include a control variable taking the value one if the deceased parent was entrepreneur. Thereby, we gain insights on the fraction of “new” businesses that are inherited. Second, we focus the tests on entrepreneurs whose parents did not own a business. If liquidity constraints are binding, we still expect to see a positive effect of windfall wealth on participation.

Our specifications also include control variables to capture changes in individual characteristics that are likely to affect income, wealth, and ultimately the desire to become an entrepreneur; we refer to these variables as preference shifters. Our preference shifters include indicator variables taking the value one if the individual: becomes married, gets divorced, or has children. We also include year fixed effects to control individual-invariant time effects. Even though our empirical strategy involves estimation over several years, no time trend exists in the general level of entrepreneurship, thus, concerns about serial correlation are kept to a minimum (Bertrand, Duflo, and Mullainathan, 2004).

IV. Empirical Results

A. Windfall wealth and the propensity to become entrepreneur

The starting point of the analysis is the 18,206 beneficiaries who were non-entrepreneurs prior to receiving windfall wealth (see Table II). If financial constraints limit firm formation, we expect beneficiaries to exhibit a larger propensity to become entrepreneurs after receiving windfall wealth. As a reference point, we note that the stock of entrepreneurs in Denmark is around 250,000, corresponding to 8% of the workforce (i.e., population in Denmark aged 18 to 65). In an average year, individuals who form

businesses number around 25,000, which is equivalent to 0.8% of the workforce. Thus, to establish a counterfactual to our natural experiment, we estimate the propensity to become an entrepreneur for a matched sample of individuals of the same age, gender, length of education, and from the same vigintile of the income and wealth distribution, as the treated individuals. For some beneficiaries we cannot identify a match, and as a result, the sample is reduced to 18,009 beneficiaries. Among these, 377 individuals (2.1% become self-employed after receiving windfall wealth. In comparison, the average propensity to become an entrepreneur is 0.83% in the matched sample. Thus, absent windfall wealth, only 150 beneficiaries were expected to have formed a business. The large difference between the expected and actual number of entrepreneurs bolsters our identification argument that windfall wealth reduces the constraints that aspiring entrepreneurs face. In Table III, we go one step further, by testing whether windfall wealth increases the propensity to become an entrepreneur.

In Table III, we run cross-sectional regressions of the propensity to become an entrepreneur. Our specifications include a cross-sectional (Columns 1 to 3) as well as a difference-in-differences approach (Columns 4 to 6), where the propensity to become an entrepreneur is evaluated relative to the matched sample. The main variable of interest is windfall wealth measured in million DKK.

Column 1 of Table III shows a positive and significant effect of inherited wealth on the propensity to become an entrepreneur. The effect is significant both economically and statistically. Windfall wealth of 1 million DKK (134,200 Euro) increases the probability of an individual starting her own business by 1.06 percentage points. This figure is relative to a baseline probability of entering into entrepreneurship of 2.1% for the sample of treated individuals, and 0.83% for the matched sample.

In Column 2, we address the critique by Hurst and Lusardi (2004) that relates to inheritance of businesses. In principle, the relationship between inheritance and

entrepreneurship could be driven by inheritance of entrepreneurial estates. In our sample, 2.6% of the estates are entrepreneurial. If beneficiaries tend to continue these businesses, the issue appears large enough to explain most of the variation in data. We therefore include an indicator for whether the deceased was an entrepreneur (*entrepreneurial estate*). Continuation of inherited businesses appears to happen quite infrequently in the data. Only roughly 1 out of 20 parents' businesses is inherited by a beneficiary.⁸ More interestingly, Column 2 reveals that the effect of windfall wealth on the propensity to become an entrepreneur remains largely unchanged. One million DKK in inheritance leads to a 0.96 percentage point higher probability of entering into entrepreneurship. Column 3 goes further by excluding entrepreneurial estates from the sample with little effect on the results. When excluding entrepreneurial estates, windfall wealth still has predictive power, as one million of inherited wealth leads to a 1.08 percentage point higher probability of business formation.

In Column 4 to 6, we evaluate the decision to become an entrepreneur while taking into account that some of the beneficiaries might have become entrepreneurs absent of the windfall. We therefore provide a difference-in-differences estimate of the propensity to become entrepreneur. The difference in differences compares the change in entrepreneurial status for the treated group to a matched sample of similar individuals who do not get windfall wealth. The matched sample consists of individuals of the same gender, education, income, and wealth as the treated individual. Consistent with the prior findings, windfall wealth is significantly related to the decision to become an entrepreneur. The marginal effect of receiving a windfall of 1 million DKK varies between 0.84 and 0.97 percentage points. Although these effects at first glance appear economically small, one has to take into account that on average 0.83% of all individuals in the control group form new businesses each year. The firm formation frequency of the treated is more than

⁸ In total there are 530 entrepreneurial estates in the sample, and only 26 of these are continued by a beneficiary.

twice as high. Thus, as is consistent with prior literature, windfall wealth allows *constrained* individuals to become entrepreneurs. Our final sample includes 355 *constrained* entrepreneurs who formed a business after receiving windfall wealth, and excludes 26 beneficiaries who inherit from an entrepreneurial estate and subsequently become entrepreneurs.

B. Ability or liquidity constraints to entrepreneurship

Our natural experiment identifies 355 potentially *constrained* entrepreneurs. To access the performance of the constrained entrepreneurs, we analyze their survival rate and profitability measured by income in relation to a matched sample. The matched sample consists of individuals of same gender, education, and pre-inheritance wealth (same vigintile excluding inheritance) who start a business at the *same* time as the treated individuals. Among the group of entrepreneurs who match these characteristics, we select the one with the most similar pre-entrepreneur income. Matching on gender, education, wealth, and timing is possible because each year, on average, around 25,000 individuals become entrepreneurs. Despite the large control group, we fail to match 51 constrained entrepreneurs, and as a result the sample is reduced to 304.⁹

Table IV reports the characteristics of constrained and unconstrained entrepreneurs. The average entrepreneur is 39.5 years old, and 72% are male. Average annual income in the year before becoming an entrepreneur is DKK 200,700 for constrained, and 207,200 for unconstrained, entrepreneurs. Net wealth, because of inheritance, is significantly larger for constrained entrepreneurs. The average constrained entrepreneur possesses wealth of DKK 1,005,200 (EUR 134,900), while unconstrained entrepreneurs possess DKK 98,800

⁹ The match frequency can be increased by decreasing the list of pre-entrepreneurship characteristics that we match on. We obtain quantitatively similar results when we match on fewer characteristics, but also note that the unmatched characteristics of constrained and unconstrained entrepreneurs become less similar. Thus, the presented matching is preferred because it provides a more precise mapping of the characteristics of constrained and unconstrained entrepreneurs. In Table IX, we conduct sensitivity analysis, varying matching criteria.

(EUR 13,300). This difference is caused by the windfall as we match on pre-inheritance wealth. Thus, without inheritance, constrained and unconstrained entrepreneurs would possess the same wealth when they form their ventures.

We evaluate the survival rates for both treatment and control groups over a five-year horizon. If the constrained entrepreneurs face liquidity constraints as a result of a market failure, we expected them to do as well as a matched sample of *unconstrained* entrepreneurs. More precisely, if no difference in the entrepreneurial ability exists, we expect the constrained entrepreneurs to survive longer because we match on pre-inheritance wealth. Table V shows average survival rates for constrained entrepreneurs and the matched sample after 1, 2, 3, 4, and 5 years, while Panel A in Figure 1 provides a plot.

Entrepreneurship is risky. On average, more than one third of the constrained entrepreneurs fail after one year, and less than half survives after five years. In comparison, the survival rates for the control group are significantly higher. After one year, only one-fourth of the matched sample went out of business, and after five years, almost half managed to survive. The difference in survival rates between constrained and unconstrained entrepreneurs is significant—both economically and statistically. After one year, the survival rate for *constrained* entrepreneurs is 10.9 percentage points lower. After two years, the difference in survival rates decreases to the 5.7 percentage point, and after three, it equals 5.3 percentage points. Four and five years after business formation, differences in survival rates equal 7.3 and 8.1 percentage points and are significant at the 10 and 5% level, respectively. The difference in survival rates implies large differences in the expected life of new businesses. Using a half-life estimate of expected lifetime, the expected number of years in business is 2 years shorter for constrained than for unconstrained entrepreneurs. The half-life estimate calculates the number of periods it takes before the cumulative probability reaches 0.5. This half-life estimate is then doubled to obtain an estimate of expected lifetimes. For constrained entrepreneurs, 4 years

transpire before the cumulative probability reaches 0.5, in comparison to 5 years for the matched sample.¹⁰ Thus, the expected lifetime of an entrepreneurial venture is, therefore, 8 years for constrained entrepreneurs and 10 years for unconstrained.

The difference in survival rates documented in Table V might reflect that *constrained* entrepreneurs are taking more risk than the average entrepreneur, or that successful exit occurs more frequently among *constrained* entrepreneurs. A plausible explanation for excessive risk taking relates to the fact that the treatment group inherited their wealth. If individuals care less about inherited wealth than wealth accumulated through personal savings and investments, then the treatment group might form riskier ventures. That being the case, more beneficiaries may occupy both the left (failures) and the right tails (success) of the performance distribution. Thus, the evidence from Table IV needs to be supplemented by evidence on the profitability of the new ventures.

In Table VI, we report the personal income for the 304 constrained entrepreneurs. We focus on personal income because we do not know how much each individual has invested in their business. In addition to income from the new ventures, personal income includes capital gains and interest payments. We note that this choice biases against finding differences in income because constrained entrepreneurs, by construction, possess significantly more wealth than unconstrained. We compare the personal income from self-employment with individuals' personal income before self-employment as well as with the average personal income for the matched sample. It should be noted that all amounts reported in the study are normalized to year 2000 DKK and are reported before tax.

On average, *constrained* entrepreneurs earned 200,700 DKK before tax in the year before they became self-employed. In the year they became self-employed, personal

¹⁰ Because we observe the employment status of individuals in November each year, the average venture is formed six months before. Thus, to estimate the half-lives, one has to add 0.5 to the half-life estimate. For constrained entrepreneurs, the cumulative abnormal probability reaches 0.5 at the midpoint between year 3 and 4, which corresponds to a half-life estimate of 4 (i.e., $0.5 + 3.5$).

income declined to 158,900 DKK, which is 20.8% lower than the pre-level. After one year of self-employment, personal income decreases to 156,900 DKK before it increases to 167,700 and 177,700 after two and three years, respectively. Thus, on average, the difference in annual personal income over three years of self-employment is equivalent to 20% of personal income before the individual becomes an entrepreneur. From year 3 to 5, income increases from DKK 177,700 to 194,100. Part of this increase can be attributed to unsuccessful entrepreneurs returning to the workforce.

The decline in income is hardly surprising, as prior literature documents lower earnings from self-employment. Using survey data on U.S. individuals, Hamilton (2000) compares the wage differential between self-employed and paid employees. He finds that the self-employed earn a significantly smaller stream of future earnings. This finding suggests that entrepreneurs are willing to sacrifice substantial earnings in exchange for non-pecuniary benefits, such as the value of “being your own boss.” Thus, to be able to conclude that the difference in earnings for constrained entrepreneurs is abnormal, we use our matched sample as the counterfactual.

The average personal income in the matched sample is 207,000 DKK before an individual enters into self-employment. In the year of becoming an entrepreneur, income drops to DKK 172,400. After one year, personal income increases to 180,500 DKK before increasing to 202,500 DKK after two years. Thus, unconstrained entrepreneurs take two years to reach earnings at the pre-entrepreneurship level. In year 3 to 5, income varies between DKK 204,500 and 216,500. Panel B in Figure provides a plot of the development of average income of constrained and unconstrained entrepreneurs.

Table VI also shows that constrained entrepreneurs have lower income than do the unconstrained. After the first year as entrepreneur, the difference in earnings is DKK 23,600, which is equivalent to 11.8% of the pre-entrepreneurship level. In years two and three, the difference increases to DKK 34,800 and 38,800, respectively. Both differences

are statistically significant at the 1% level. In years 4 and 5 the difference in earning declines to DKK 29,700 and 10,400, respectively. This increase occurs because the income of constrained entrepreneurs remains constant while it increases for unconstrained entrepreneurs. Part of this increase can be attributed to entrepreneurs who fail to survive, and, thus return to the labor market in later periods. To separate this effect from the analysis of differences in earnings, Panels B and C report entrepreneurial income for all entrepreneurs in Panel B, and for surviving entrepreneurs in Panel C.

Panel B of Table VI documents that unconstrained entrepreneurs have higher entrepreneurial income than do constrained entrepreneurs. The average differences in entrepreneurial income vary between DKK 29,600 and 68,700 per year. Moreover, all differences are both economically and statistically significant. Panel C shows that differences in entrepreneurial income persists when the sample is reduced to surviving entrepreneurs (both treatment and control have to survive). Again we find that unconstrained entrepreneurs have higher income from entrepreneurship. The differences are large and significant in initial phase. By the end of the 5 year when most of the constrained entrepreneurs have failed, only the competent entrepreneurs remains and we do not observe any income difference anymore.

Although the comparison between constrained and unconstrained entrepreneurs successfully controls for time-invariant individual heterogeneity captured by our match characteristics (e.g., age, gender, education, income, and pre-inheritance wealth) that might affect entrepreneurial outcomes, it is still interesting to examine the marginal effect of individual characteristics. The regression analysis also makes possible controlling for individual characteristics that we do not match on (e.g., marital status). In Table VII, therefore, we run panel data regressions of entrepreneurial outcomes, while controlling for individual characteristics, and report the marginal effects.

In Column 1 of Table VII, the dependent variable is business failure taking the value one if the venture is closed. We include age, gender, education, pre-entrepreneurship income, pre-inheritance and pre-entrepreneurship wealth, and indicator variables equal to one if the entrepreneur is married or has children. We use panel data to evaluate the performance over the five-year window, and estimate the relationship in a logit model. The results reveal that constrained entrepreneurs, on average, are 8.85 percentage points more likely to go out of business. This difference is significant at the 1% level. We also note that the coefficients on the control variables are consistent with prior literature: Entrepreneurial survival is increasing in education, pre-income, and pre-wealth and is decreasing in age.

In Column 4, we estimate a proportional hazard model that takes into account that outcomes are censored for entrepreneurs who fail. Given that the outcome is discrete, we estimate a baseline hazard function using a cubic polynomial for the hazard function as a Taylor-approximation. We find a hazard rate of 1.289 for constrained entrepreneurs, which is significant at the 5% level. Thus, constrained entrepreneurs fail much faster than unconstrained entrepreneurs.

In Columns 2 and 3, we estimate the income from entrepreneurship. Again we use the panel dimension of the data to examine whether constrained entrepreneurs have lower income, while controlling for individuals characteristics and year-fixed effects. Column 2 shows that constrained entrepreneurs, on average, have DKR 25,810 lower income per year than do unconstrained entrepreneurs in the five years after business formation. Column 3 documents that differences in entrepreneurial income are driving the differences in personal income, as constrained entrepreneurs, on average, earn DKK 64,700 lower income per year.¹¹ These differences are relative to a pre-entrepreneurship income of DKR 200,700, and are, thus, economically significant. While these differences

¹¹ Note that part of the large difference in entrepreneurial income is offset by larger capital income among constrained entrepreneurs because they receive windfall wealth.

document lower earnings, Column 5 examines whether surviving entrepreneurs also have lower income. Consistently, we find significantly lower personal and entrepreneurial income among surviving entrepreneurs. On average, constrained entrepreneurs have DKK 36,000 lower income from entrepreneurship when the sample is restricted to surviving ventures. If we focus on income from entrepreneurial sources, the average difference is DKK 69,200 per year.

Although the evidence in Tables V, VI, and VII supports the interpretation that entrepreneurs face financial constraints because of low entrepreneurial ability, inheritance in itself might affect the performance of the new ventures. Sudden death of parents and subsequent inheritance might affect performance related to early retirement, grief, or reduced effort. To assess whether this circumstance explains the large uncovered differences in performance, we perform an out-of-sample test by identifying unconstrained entrepreneurs whose parents die suddenly in the first three years after business formation.¹² The entrepreneurs are unconstrained in the sense that they started their business before receiving windfall wealth. Table VIII reports the average survival rates and entrepreneurial income compared to a matched sample of unconstrained entrepreneurs who do not receive windfall wealth. We note that unconstrained entrepreneurs who receive windfalls do as well or slightly better than unconstrained entrepreneurs in the matched sample. This is consistent with the findings of Holtz-Eakin, Joulfaian, and Rosen (1994b) who analyze the effect of inherited wealth on performance of existing entrepreneurs two to three years after receiving an inheritance. We also note that the higher survival rates and higher income tend to decline over time. Thus, the sudden death of a parent does not appear to have a negative effect on the outcome of

¹² While one might expect to trace an entrepreneur's grief over a parent's death to lower performance by an entrepreneur, our findings indicate otherwise. On average, one year passes from the event of death to firm formation. Though the death of parents is tragic, it doesn't appear to significantly affect business performance for up to 6 years.

their ventures. This finding bolsters our interpretation that the lower survival rates and income of constrained entrepreneurs are driven by lower entrepreneurial ability.

In summary, *constrained* entrepreneurs appear to have significantly poorer entrepreneurial abilities than have the average entrepreneur. They go out of business significantly faster and have significantly lower profits from their ventures. The poor performance suggests that these individuals face constraints to entrepreneurship because of issues relating to low ability rather than to access to financing.

V. Alternative Specifications and Robustness Checks

A. Matching on *post-inheritance wealth*

One concern with the prior analysis is our ability to identify a matched sample of similar individuals. In particular, Hvide and Møen (2010) show that entrepreneurs' start-up performance is a function of their wealth. They find that the relationship between start-up performance, as measured by profitability on assets, and wealth increases in the first three wealth quartiles, but drops in the top wealth quartile. Thus, our results might have more to do with entrepreneurship being a luxury good, than with differences in entrepreneurial ability. We address this issue by revising our match characteristics. Rather than matching on pre-inheritance wealth, we match on the post-inheritance level. If our results are driven by the luxury good interpretation, we should expect to see no difference in performance between constrained and unconstrained entrepreneurs. Column 1 in Table IX reports the results.

The findings in Column 1 make evident that large differences in performance between the constrained and unconstrained are not driven by the effect of wealth on firm performance. When we match based on post-inheritance wealth, the differences in failure rates and entrepreneurial income increases slightly. This result is expected if wealth

correlates with entrepreneurial ability. We conclude that our results are not driven by wealth effects.

B. Matching on parental wealth

Differences in parental wealth might also influence aspiring entrepreneurs' ability to form a successful venture. In particular, we find that beneficiaries' propensity to become self-employed is increasing in inherited wealth, and, thus parental wealth. Parental wealth might capture individual heterogeneity related to the desire to become an entrepreneur. Individuals from wealthy families might be less motivated to exert effort which will limit the outcome of the venture. Although matching on the post-inheritance wealth level partly addresses this issue, one might still be concerned with the possibility of family wealth influencing the results. In Column 2 of Table IX, we therefore report the performance of constrained entrepreneurs in relation to a matched sample of unconstrained entrepreneurs from equally wealthy families. From Column 2 of Table IX, we observe large economic underperformance of constrained entrepreneurs, consistent with the main results.

C. Matching on parental age

Another concern relates to whether inheritance is anticipated. Although we restrict the sample to sudden deaths, individuals might know their parent's exact wealth and might be able to borrow against expected inheritance. To control for this possibility, we include a match on the basis of parental age along with existing match characteristics. By matching on parental age, we control for differences in behavior related to anticipated bequests. Parental age is the minimum age of living parents; Column 3 in Table IX reports the results, which are all consistent with the prior analysis.

C. Matching at the industry level

To ascertain that our results are not driven by differences in the industry composition of the treatment and control group, we match on the industry level. If entrepreneurship is considered a luxury good, one could argue that constrained entrepreneurs start businesses in unprofitable industries to become leisure entrepreneurs. Similarly, Nanda (2011) shows that wealthy entrepreneurs have lower start-up performance in capital intensive industries. We therefore use the four-digit NACE industry code (i.e., European equivalent to the four digit SIC). For 60 out of 304 constrained entrepreneurs, the industry code is classified as “unknown” (i.e., NACE 9999). Thus, after matching on industry, we retain 244 pairs of constrained and unconstrained entrepreneurs. The most frequent industry is retail, with 40 out of 244 (16.4%), followed by 32 in business services (13.1%), and 19 in hotel and restaurants (7.8%). The remainder is spread across 50 industries.

Column 4 in Table IX reports our result when we match on age, gender, education, pre-inheritance wealth, income, and industry. Despite the small sample size, we find results that are similar to the previous analysis. Differences in industry composition of entrepreneurs cannot explain our results. Thus, our results are not driven by leisured entrepreneurs who, because they can afford to do so, start businesses in unprofitable industries.

E. Matching with k -nearest neighbors

To further ascertain that our results are driven by the way we identified the matched sample, we expand the matched sample to include the nearest 5 individuals, among those that fit the general match criteria, with the most similar pre-entrepreneur income. Thus, Column 5 in Table IX compares the performance of constrained entrepreneurs to the average performance of the 5 most similar unconstrained entrepreneurs. We note that our results do not change when we expand the control group.

VI. Conclusions

Liquidity constraints are frequently cited as a main barrier to entrepreneurship. Evidence of such liquidity constraints has previously been identified either in cross-sectional tests of the propensity to become an entrepreneur or in surveys of aspiring entrepreneurs. While the evidence is consistent with the existence of liquidity constraints, prior literature has not presented a formal test of the underlying causes of the apparent liquidity constraint. In this study, we propose and examine a simple explanation for the apparent financial constraints to entrepreneurship. We conjecture that a well-functioning capital market would fund able entrepreneurs and constrain individuals with lower entrepreneurial ability. Using a natural experiment to generate exogenous variation in wealth, we identify a group of previously constrained individuals, who become entrepreneurs after receiving the windfall. We compare the performance of these ventures to the performance of ventures established by unconstrained entrepreneurs. We find large differences in the performance, suggesting that some individuals face financial constraint because of low entrepreneurial ability rather than a market failure. Collectively, the results suggest that capital markets work sufficiently well in funding individuals with worthy entrepreneurial projects.

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Table I. Causes of Household Terminations, 1995–2001

	IDC10	Year							Total
		1995	1996	1997	1998	1999	2000	2001	
A. Household terminations	A00-Z98	10,555	10,938	11,538	11,631	12,517	12,864	13,559	83,602
B. Decedent's cause of death									
Natural	A00-R99	1,461	1,306	1,359	1,279	1,408	1,483	1,542	9,838
Acute myocardial infarction (a)	I22-I23	154	85	96	90	101	85	91	702
Cardiac arrest (b)	I46	98	95	80	63	81	85	81	583
Congestive heart failure (c)	I50	765	799	848	794	868	975	1,006	6,055
Stroke (d)	I60-I69	223	240	227	245	287	232	292	1,746
Sudden death by unknown cause (e)	R95-R97	221	87	108	87	71	106	72	752
Unnatural deaths	V00-Z98	267	276	350	297	359	364	317	2,230
Traffic accidents (f)	V00-V89	66	49	48	43	54	63	51	374
Other accidents and violence (g)	V90-V99								
	X00-X59	201	227	302	254	305	301	266	1,856
	X86-X90								
C. Sudden household terminations (a+b+c+d+e+f+g)		1,728	1,582	1,709	1,576	1,767	1,847	1,859	12,068
Average number of beneficiaries		1.49	1.63	1.57	1.57	1.59	1.64	1.70	1.60
Number of beneficiaries		2,560	2,587	2,697	2,479	2,844	3,029	3,133	19,329

Note: This table tabulates the cause of death using ICD-10 classification of diseases for terminated households from 1995 to 2001. A household is terminated if the deceased was a widow or widower, or, in the rare cases in which a couple dies within the same year. *ICD-10* is the World Health Organization's International Classification of Diseases. Codes are: Natural (A00-R99) and unnatural deaths (V00-Z98). Within both natural and unnatural deaths, Panel B shows the number of sudden deaths caused by: Myocardial (I22-I23); Cardiac arrest (I46); Congestive heart failure (I50); Stroke (I60-69); Sudden unexpected deaths (R95-R97); Traffic accidents (V00–V89); and other accidents and violence (V90-V99, X00-X59 & X86-X90). Other accident and violence do not include suicides or violence caused by relatives of the decedent.

Table II. Characteristics of Pre-Inheritance Entrepreneurs vs. Non-entrepreneurs

	All	Pre-inheritance Entrepreneur		Difference (1)-(2)
		Yes (1)	No (2)	
<i>Panel A: Income, financial wealth, and net wealth</i>				
Income after tax (DKK 1,000)	209.9 (145.4)	192.0 (197.6)	211.0 (141.5)	-19.1*** [-4.26]
Financial wealth (DKK 1,000)	97.7 (788.2)	270.4 (919.3)	87.1 (778.1)	183.4*** [7.58]
Net wealth (DKK 1,000)	133.9 (1115.0)	394.2 (1995.1)	117.8 (1034.5)	276.4*** [8.08]
<i>Panel B: Individual characteristics</i>				
Age (years)	41.4 (10.2)	45.3 (9.0)	41.1 (10.3)	4.1*** [13.20]
Gender (% male)	54.0 (49.9)	79.0 (40.8)	52.5 (50.0)	26.5*** [17.44]
Education (years)	11.8 (2.9)	11.9 (3.0)	11.8 (2.9)	0.1 [0.75]
Married (%)	51.9 (50.0)	64.6 (47.8)	51.1 (50.0)	13.5*** [8.81]
Children in household (%)	46.1 (49.9)	49.0 (50.0)	46.0 (49.8)	3.0** [1.97]
<i>Panel C: Inherited wealth</i>				
Average	228.8 (883.1)	364.2 (869.5)	220.4 (883.2)	143.7*** [5.30]
1 st quartile	0.6 (1.1)	0.7 (1.2)	0.6 (1.0)	0.2** [2.15]
2 nd quartile	17.8 (11.9)	19.7 (12.0)	17.7 (11.9)	1.9** [2.56]
3 rd quartile	145.2 (68.4)	153.6 (68.2)	144.7 (68.4)	9.0** [2.15]
4 th quartile	859.6 (1753.1)	965.6 (1315.5)	849.2 (1789.9)	116.3 [1.22]
N	19,329	1,123	18,206	

Note: We report descriptive statistics (mean and standard deviation) for all beneficiaries, beneficiaries who are pre-inheritance entrepreneurs and non-entrepreneurs, respectively. For each beneficiary, we report income before tax, financial wealth (bank account, bonds, and stocks), net wealth before inheritance, age, gender, education (years of schooling), marital status, and whether there are children in the household. For each set of descriptive statistics, we also compute the difference in the average characteristics of pre-inheritance entrepreneurs and non-entrepreneurs and test whether these differences are significantly different from zero. All amounts are in thousand year-2000 DKK. One Euro is equivalent to 7.45 DKK. Standard errors are in parentheses, and t-statistics are in square brackets. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

Table III. Exogenous Changes in Wealth and Firm Formation

Independent variable	Propensity to become entrepreneur			Difference-in-differences estimate of the propensity to become entrepreneur		
	All	All	Non-entrepreneurial estates	All	All	Non-entrepreneurial estates
Sample	(1)	(2)	(3)	(4)	(5)	(6)
Inherited wealth	0.0109*** (0.0022)	0.0098*** (0.0022)	0.0113*** (0.0028)	0.0097*** (0.0022)	0.0086*** (0.0022)	0.0102*** (0.0028)
Inherited wealth Squared	-0.0003*** (0.0001)	-0.0002*** (0.0001)	-0.0005** (0.0002)	-0.0002*** (0.0001)	-0.0002*** (0.0001)	-0.0005** (0.0002)
Entrepreneurial Estate		0.0231*** (0.0066)			0.0232*** (0.0066)	
Preference shifters	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	18,009	18,009	17,539	18,009	18,009	17,539

Note: The dependent variable is an indicator for whether individuals become entrepreneurs after the sudden inheritance. Columns 1 to 3 explain the propensity to become entrepreneurs, whereas Columns 4 to 6 compare the propensity to become entrepreneur to a matched sample. The matched sample consists of individuals of same gender, length of education, percentile of the income distribution, and percentile of the wealth distribution. *Inherited wealth* is measured in million year-2000 DKK. *Inherited wealth squared* is the square of inherited wealth. Preference shifters include controls (indicator variables) for changes in marital status and family size. Standard errors are in parentheses. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

Table IV. Characteristics of Constrained vs. Unconstrained Entrepreneurs

Pre-entrepreneurship characteristics	Constrained (1)	Unconstrained (2)	Difference (1)-(2)
<i>Panel A: Income, financial wealth and net wealth</i>			
Income before tax (DKK 1,000)	200.7 (7.7)	207.2 (6.2)	-6.3 [-1.26]
Financial wealth (DKK 1,000)	1089.6 (936.9)	98.8 (51.3)	990.9 [1.07]
Net wealth (DKK 1,000)	1005.2 (945.9)	98.8 (513.4)	953.7 [1.02]
<i>Panel B: Individual characteristics</i>			
Age (years)	39.5 (0.5)	39.5 (0.5)	-
Gender (% male)	71.7 (0.03)	71.7 (0.03)	-
Education (years)	12.0 (0.2)	12.0 (0.2)	-
Married (%)	54.3 (0.1)	51.3 (0.1)	3.0 [0.76]
Children in household (%)	49.7 (0.1)	46.7 (0.1)	3.0 [0.83]
N	304	304	

Note: We report descriptive statistics (mean and standard error) for constrained and unconstrained entrepreneurs. Constrained entrepreneurs are beneficiaries that become entrepreneurs after receiving windfall wealth due to the sudden death of their parents. The match sample of unconstrained entrepreneurs consists of individuals who were able to start their businesses without receiving windfall wealth. Unconstrained entrepreneurs have the same age, gender, education, income and wealth, and started their businesses at the same time as the constrained entrepreneurs. We report income before tax, financial wealth (bank account, bonds, and stocks), net wealth after inheritance, age, gender, education (years of schooling), marital status, and whether there are children in the household. For each set of descriptive statistics, we also compute the difference in the average characteristics of constrained and unconstrained entrepreneurs and test whether these differences are significantly different from zero. All amounts are in thousand year-2000 DKK. Standard errors are in parentheses, and t-statistics are in square brackets. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

Table V. Firm Survival Rates of Constrained vs. Unconstrained Entrepreneurs

	Survival rates after				
	1 year	2 years	3 years	4 years	5 years
Constrained entrepreneurs	0.641	0.580	0.535	0.457	0.419
Unconstrained entrepreneurs	0.750	0.637	0.588	0.530	0.500
Difference	-0.109*** [-2.90]	-0.057 [-1.49]	-0.053 [-1.34]	-0.073* [-1.92]	-0.081** [-1.98]
N	304	304	304	304	304

Note: This table reports the survival rates for the 304 *constrained* individuals who become entrepreneurs after receiving a windfall wealth due to the sudden death of their parents. The matched sample of 304 unconstrained entrepreneurs consists of individuals who were able to start their businesses without receiving windfall wealth. Unconstrained entrepreneurs have the same age, gender, education, income and wealth, and started the business at the same time as the constrained entrepreneurs. Difference is the difference in survival rates between constrained and unconstrained entrepreneurs. t-statistics are in square brackets. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

Table VI. Changes in Income for Constrained vs. Unconstrained Entrepreneurs

	Income before tax (DKK 1,000)						
	Before	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
	<i>Panel A: Personal income</i>						
Constrained entrepreneurs	200.7	158.9	156.9	167.7	177.7	177.2	194.1
Unconstrained entrepreneurs	207.0	172.4	180.5	202.5	216.5	206.9	204.5
Difference	-6.3 [-1.26]	-13.5 [-1.39]	-23.6 [-1.63]	-34.8*** [-2.69]	-38.8*** [-3.03]	-29.7** [-2.40]	-10.4 [-0.85]
N	304	304	300	304	304	304	304
	<i>Panel B: Entrepreneurial income</i>						
Constrained entrepreneurs	-	99.2	141.7	123.5	114.9	110.4	115.1
Unconstrained entrepreneurs	-	128.8	182.7	184.6	183.0	179.1	155.2
Difference		-29.6** [-2.00]	-41.0** [-1.98]	-61.0*** [-2.90]	-68.1*** [-2.90]	-68.7*** [-2.89]	-40.0* [-1.73]
N	0	304	304	304	304	304	304
	<i>Panel C: Entrepreneurial income among surviving firms</i>						
Constrained entrepreneurs	-	99.2	170.8	168.9	181.0	210.6	260.6
Unconstrained entrepreneurs	-	128.8	196.9	235.8	243.3	251.1	268.9
Difference		-29.6** [-2.00]	-26.1 [-1.30]	-67.0*** [-2.86]	-62.3** [-1.99]	-40.4 [-1.26]	6.3 [-0.01]
N	0	304	227	202	169	132	104

Note: This table reports income for the 304 *constrained* individuals who become self-employed after receiving windfall wealth. The matched sample of 304 *unconstrained* entrepreneurs consists of individuals who were able to start their businesses without receiving windfall wealth. Unconstrained entrepreneurs have the same age, gender, education, income and wealth, and started the business at the same time as the constrained entrepreneurs. Panel A reports personal income; Panel B reports entrepreneurial income; while Panel C reports entrepreneurial income for surviving firms. Difference is the difference in income between constrained and unconstrained entrepreneurs. t-statistics are in square brackets. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

Table VII. Determinants of Business Failure Rates, Personal and Entrepreneurial Income

Sample	All			Surviving Entrepreneurs		
	Business failure	Personal income	Entrepreneurial income	Business Failure	Personal income	Entrepreneurial income
Independent variable	Logit	OLS	OLS	Hazard	OLS	OLS
Model	(1)	(2)	(3)	(4)	(5)	(6)
Constrained	-0.0885*** (0.0179)	-25.81*** (6.02)	-64.74*** (10.00)	1.289** (0.130)	-35.7*** (8.52)	-69.21*** (14.41)
Age	-0.0036*** (0.0011)	-0.65* (0.35)	-3.09*** (0.58)	1.012** (0.006)	-0.84* (0.50)	-4.38*** (0.84)
Male	0.0179 (0.0202)	6.16 (6.76)	25.10** (11.24)	0.950 (0.109)	2.51 (9.79)	29.35* (16.6)
Education	0.0070** (0.0032)	3.69** (1.06)	8.06*** (1.76)	0.967* (0.018)	2.42 (1.56)	12.03*** (2.64)
Pre-income (DKK 1000)	0.0003*** (0.0001)	0.49*** (0.03)	0.49*** (0.04)	0.999 (0.004)	0.55*** (0.04)	0.61*** (0.06)
Pre-wealth (DKK 1000)	0.0000*** (0.0000)	-0.001 (0.001)	0.002 (0.002)	1.000* (0.000)	-0.001 (0.001)	0.001 (0.001)
Married	0.0632*** (0.0201)	6.10 (6.74)	64.3*** (11.12)	0.813* (0.094)	7.56 (9.95)	86.5*** (16.82)
Children	-0.0200 (0.0197)	-7.89 (6.58)	10.6 (10.9)	1.001 (0.114)	-1.72 (9.58)	12.97 (16.20)
Year effects	Yes	Yes, fixed	Yes, fixed	Yes	Yes, fixed	Yes, fixed
N	3023	3013	3013	1871	1892	1892

Note: Column 1 reports the marginal effect of characteristics on entrepreneurial failure, using a logit model. Columns 2 and 3 report the marginal effect on personal and entrepreneurial income after becoming an entrepreneur. Column 4 reports the hazard ratio on entrepreneurial failure, using a cubic Taylor approximation as the baseline hazard function. Columns 5 and 6 report the marginal income effect for the surviving entrepreneurs. Columns 1 to 3 use the balanced five-year panel data from year 1 to 5, while Columns 4 to 6 use the unbalanced panel data where failing entrepreneurs subsequently are dropped from the sample. The matched sample consists of individuals of same gender, length of education, percentile of the income distribution, and percentile of the wealth distribution. *Constrained* is an indicator for being classified as a constrained entrepreneur. *Inherited wealth* is measured in million Danish Kroner. *Inherited wealth squared* is the square of inherited wealth. Preference shifters include controls (indicator variables) for changes in marital status and family size. Standard errors are in parentheses. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

Table VIII. Performance of Unconstrained Entrepreneurs

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<i>Panel A: Survival rates</i>						
Treated entrepreneurs	1.000	0.852	0.762	0.608	0.513	0.469
Untreated entrepreneurs	1.000	0.643	0.592	0.521	0.484	0.437
Difference	-	0.209***	0.170***	0.087**	0.029	0.032
		[6.15]	[4.54]	[2.27]	[0.72]	[0.83]
<i>Panel B: Entrepreneurial income</i>						
Treated entrepreneurs	118.0	178.8	162.6	157.0	146.8	146.0
Untreated entrepreneurs	133.7	169.4	152.2	145.0	138.7	154.6
Difference	-15.7	9.4	10.5	12.1	8.1	-8.6
	[-0.97]	[0.49]	[0.57]	[0.63]	[0.48]	[-0.32]
N	311	311	311	311	311	311

Note: This table reports the survival rates for 311 *treated entrepreneurs* who received windfall wealth one to three years after becoming an entrepreneur. The matched sample of 311 *untreated entrepreneurs* has the same age, gender, education, income and wealth, and started the business at the same time as the treated entrepreneurs. Both groups are unconstrained because they started their businesses without anticipating potential windfalls. *Difference* is the difference in survival rates between treated entrepreneurs who inherit and untreated entrepreneurs who do not inherit. t-statistics are in square brackets. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

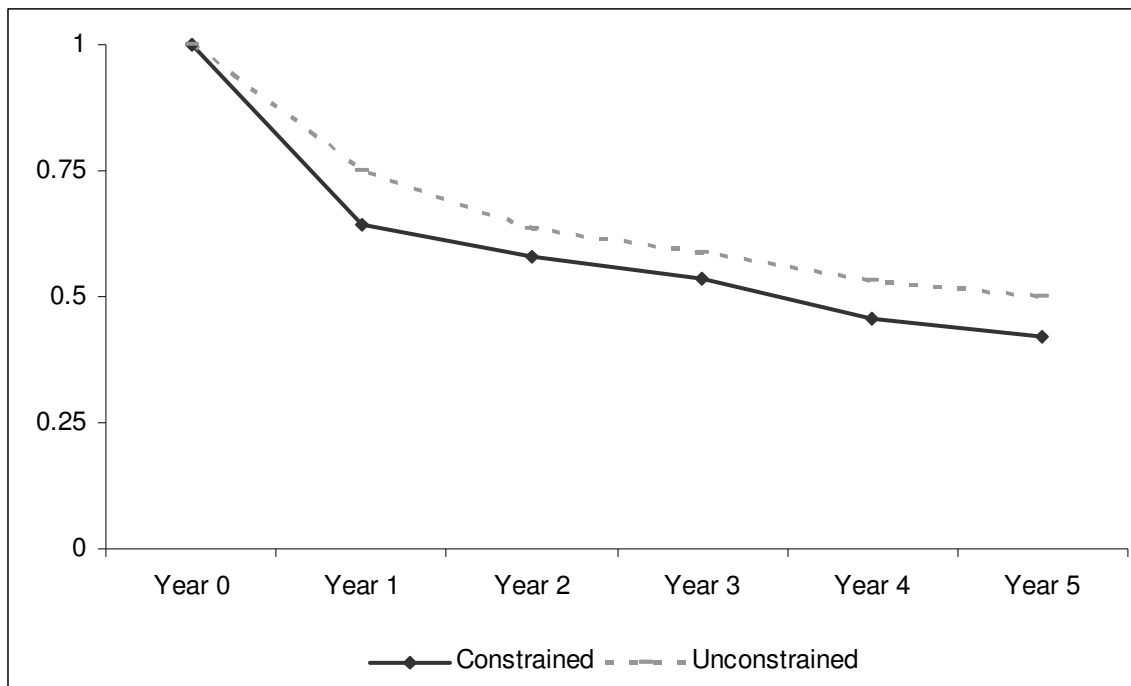
Table IX. Alternative specifications

	Matching criteria				
	Post-inheritance wealth	Parental wealth	Parental age	Industry match	Nearest 5 neighbors
	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Hazard Model of Business Failure</i>					
Constrained	1.314*** (0.135)	1.050 (0.099)	1.302** (0.153)	1.297** (0.156)	1.236*** (0.097)
Control variables	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes
N	1872	2242	1445	1529	6334
<i>Panel B: OLS Regression of Personal Income</i>					
Constrained	-32.38*** (8.94)	-22.69*** (6.80)	-29.62*** (7.92)	-32.64*** (7.79)	-33.61*** (7.84)
Control variables	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
N	1896	2235	1460	1527	6329
<i>Panel C: OLS Regression of Entrepreneurial Income</i>					
Constrained	-70.18*** (15.41)	-26.52** (10.61)	-75.26*** (20.32)	-34.77*** (12.93)	-51.81*** (12.43)
Control variables	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
N	1896	2235	1460	1527	6329

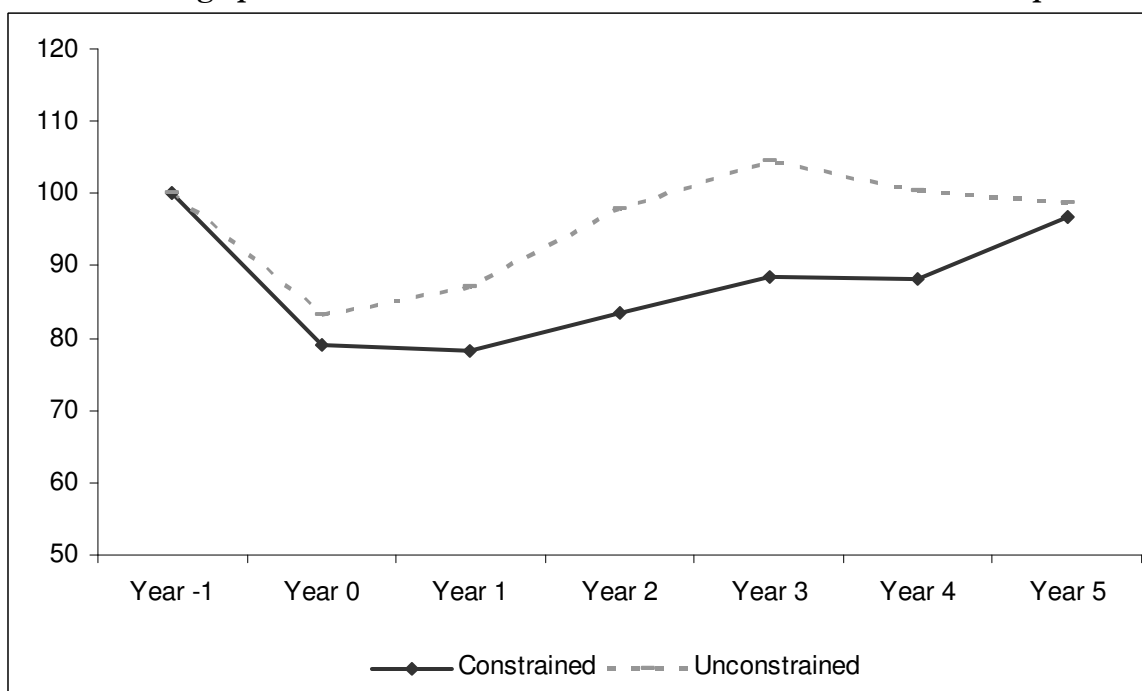
Note: This table reports the differences in hazard ratios of business failure and entrepreneurial income between constrained and unconstrained entrepreneurs. *Constrained* is an indicator for being classified as a constrained entrepreneur. Constrained entrepreneurs are individuals who become self-employed after receiving windfall wealth. Unconstrained entrepreneurs are a matched sample of individuals who were able to start their businesses without receiving windfall wealth. Unconstrained entrepreneurs have the same age, gender, education, income and (pre-inheritance) wealth, and started their businesses at the same time as the constrained entrepreneurs. Regressions in Panel A, B, and C are specified as Columns 4, 5, and 6 in Table VII, respectively. Control variables include age, male, education, pre-entrepreneurship income, pre-entrepreneurship wealth, married, and children. We report five different specifications: *Post-inheritance wealth* use post-inheritance instead of pre-inheritance wealth to form the matched sample of unconstrained entrepreneurs. *Parental wealth* use parental wealth instead of individual wealth to form the matched sample of unconstrained entrepreneurs. *Parental age* includes the minimum of the parents' age as a match characteristic. For *Parental wealth* and *Parental age*, we only include gender, education, and income from the original match characteristics. *Industry match* identifies the individual within the 4-digit NACE industry group with the most similar pre-entrepreneur income. *Nearest 5 neighbors* includes the 5 individuals who have the most similar pre-entrepreneur income among those that fit the general match characteristics. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

Figure I

Panel A: Average survival rates of constrained versus unconstrained entrepreneurs



Panel B: Average personal income of constrained versus unconstrained entrepreneurs



Note: This figure plots survival rates and personal income for constrained and unconstrained entrepreneurs. Constrained entrepreneurs are individuals who become self-employed after receiving a windfall wealth. Unconstrained entrepreneurs are a matched sample of individuals who were able to start their businesses without receiving windfall wealth. Unconstrained entrepreneurs have the same age, gender, education, income, and pre-inheritance wealth, and started the business at the same time as the constrained entrepreneurs. Personal income is indexed to the pre-entrepreneurship level in Panel B (Year -1 = 100).