

FINANCIAL CONSTRAINTS AND SELECTION INTO ENTREPRENEURSHIP*

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May 24, 2024

Abstract

We exploit a reduction in the minimum capital required to incorporate a limited liability company in Norway to study selection into entrepreneurship. We find that lowering the capital requirement from \$17,000 to \$5,000 roughly doubles the number of incorporations, indicating a large presence of marginal entrepreneurs sensitive to policy-induced reductions in financial constraints. We further examine whether there is a quantity-quality tradeoff wherein marginal entrepreneurs are of lower entrepreneurial ability. By contrasting the characteristics of pre- and post-reform entrants, we find no evidence that marginal entrepreneurs are different: they do not have lower IQ scores, lower prior incomes, or less education. We further find no evidence that post-reform entrants have less ex-ante liquidity, suggesting that the reform primarily facilitated the entry of optimally-small firms as opposed to previously liquidity-constrained entrepreneurs. Consistent with this, we find that post-reform firms are smaller in terms of assets and revenues but are not less profitable.

Keywords: Entrepreneurship, ability, selection, incorporation

JEL codes: G50, G38, G31, J24

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1 Introduction

Entrepreneurship is considered to drive economic growth by both policy makers and economists. As a consequence, policies aimed at facilitating more entrepreneurial activity is ubiquitous across the developed world. Governments particularly strive to lessen the financial hurdles faced by potential entrepreneurs in order to facilitate more economic growth. However, there is looming uncertainty regarding whether the *marginal* entrepreneurial entries caused by these policies add any economic value due to a quality-quantity tradeoff (Schoar 2010, Hurst and Pugsley 2011, Guzman and Stern 2020, Bonelli, Liebersohn, and Lyonnet 2021). One example is when entrepreneurial ability is correlated with personal liquidity. In this case, relaxing financial constraints facilitates the entry of lower-ability entrepreneurs who may add little economic value.

To better understand how policies aimed at reducing financial barriers affects selection into entrepreneurship, we exploit a 2012 reform that lowered the required amount of capital to incorporate a limited liability company in Norway. Prior to the reform, all firms needed to incorporate with at least \$17,000 of equity. To encourage more business creation, the government lowered this equity requirement to \$5,000 in 2012. We find that this reform had a large effect on incorporations. In the years following the reform, the annual number of new incorporated firms doubles. This large effect on business creation is not simply driven by expanding conglomerates. We find that incorporation rates double even among ex-ante non-entrepreneurs, which indicates that there was a substantial mass of “marginal” entrepreneurs sensitive to modest reductions in financial barriers to entrepreneurship. We also find no evidence that the effect is driven by a substitution away from unincorporated entrepreneurship.

The strong effect of the reform on entrepreneurial entry begs the question of how these new, marginal entrepreneurs differ from existing entrepreneurs. To build intuition, we develop a simple model of selection into entrepreneurship along the lines of Evans and Jovanovic (1989). We allow for a correlation between liquidity and entrepreneurial ability and include the standard feature that individuals only become entrepreneurs if the payoff exceeds that of some outside option such as continuing as an employee.

In our model, there are two main channels through which lowering the equity requirement selects on ability. First, by facilitating the entry of lower-liquidity entrepreneurs, we expect average ability to decrease if ability and liquidity are correlated. However, among low-liquidity entrepreneurs, high-ability entrepreneurs are more likely to satisfy the outside-option constraint, creating a second effect through which average entrepreneurial ability increases. We call this the liquidity channel. Second is the small-business channel. Due to the concavity of the profit function, some entrepreneurs would not be able to satisfy

the outside option constraint if their capital amount is too large. These are entrepreneurs with an optimal capital amount well below the ex-ante capital requirement. By lowering the capital requirement, more of these entrepreneurs will choose to enter, which selects negatively on ability and positively on the degree of concavity of the profit function.

Our model highlights the ambiguity in how reducing the financial hurdles to incorporate a firm selects on entrepreneurial ability. This ambiguity is complemented by important issues related to measuring the abstract notion of entrepreneurial ability using real-world data. Our main approach is to study whether marginal entrepreneurs differ in terms of *ex-ante* characteristics, which is facilitated by combining data from business registers with tax returns, educational attainment registers, and military enlistment test scores. This circumvents the identification problem that reforms which increase entrepreneurial entry may affect ex-post outcomes, such as profitability, through more than a pure selection effect. It also addresses the more theoretical issue that when entrepreneurs optimally chose firm size given their level of ability, then observed profitability may be invariant to ability.

One key channel through which relaxing capital requirements causes entrepreneurship is by allowing low-liquidity individuals to satisfy the requirement and thus become entrepreneurs. We thus first consider the level of ex-ante liquid wealth of entrants around the reform. However, we find no evidence that post-reform entrepreneurs have less ex-ante liquidity. This surprising finding indicates a limited role for financial constraints in our setting. There were few entrepreneurs who wanted to incorporate but lacked the necessary liquidity to satisfy the incorporation requirement. Our theoretical framework then suggests that the small-business channel is the most important. In this channel, lowering the equity requirement selects negatively on optimal business size, which is positively correlated with ability but negatively correlated with the concavity of the profit function. While we cannot observe an individual's profit function, our data include several proxies for ability. Interestingly, we find no evidence that post-reform entrepreneurs have lower IQ scores, less education, or lower prior income levels. This suggests that the small-business channel primarily works by selecting "high-concavity" entrepreneurs who optimally start smaller firms but are not necessarily of lower ability.

To shed some further light, we next explore ex-post outcomes of firms. We find no evidence that post-reform entrants are less likely to be economically active six years later, nor do we find any evidence that they have lower profitability. These findings are consistent with the prior findings of no differences on ex-ante proxies for ability. However, our theoretical model unambiguously predicts that post-reform entrepreneurs operate smaller firms. This prediction has strong support in the data. Firms that incorporate after 2012 are considerably smaller in terms of assets. In the year of incorporation, post-reform firms have \$100,000 less in total book assets. This difference is much larger than the pure mechanical

effect of reducing the equity requirement from \$17,000 to \$5,000, which is in part due to post-reform firms having less debt financing. At incorporation, we find that \$1 less in equity financing is associated with \$1.7 less in debt financing from banks or bondholders. We further find no evidence that this asset gap shrinks over time. In levels, the asset gap increases to about \$200,000 by 2015, which indicates strong path dependence (Hvide and Meling, 2023). Nevertheless, there is no evidence that post-reform firms have lower *growth rates*. The balance sheets of both pre- and post-reform firms grow at about 5% per year.

Consistent with sharp differences in terms of asset size, we also find that post-reform entrants have less revenue. By the end of our sample, post-reform entrants have approximately \$100,000 lower revenues. This effect is also persistent. Post-reform entrants have similar growth rates, thus the nominal revenue gap increases considerably over time.

Literature. We contribute to a growing literature on business regulation and entrepreneurship (Djankov, La Porta, Lopez-de Silanes, and Shleifer 2002, Klapper, Laeven, and Rajan 2006, Branstetter, Lima, Taylor, and Venâncio 2014, Kaplan, Piedra, and Seira 2011, Cui and Wei 2022, Barwick, Chen, Li, and Zhang 2022, Fang, Li, Wu, and Zhang 2023). While several papers document that entry regulation hampers business formation, there is no consensus on whether easing these regulations facilitate value-added entrepreneurship. While Djankov et al. (2002) argue that business regulation has negative economy-wide effects, Branstetter, Lima, Taylor, and Venâncio (2014) find that deregulating lowers the quality of new firms in terms of the founders' education levels and the firms' survival probabilities. Cui and Wei (2022) and Barwick et al. (2022), on the other hand, find that deregulation causes the entry of higher-productivity entrepreneurs. Closest to our paper are Cui and Wei (2022) and Barwick et al. (2022) who exploit Chinese reforms that entirely or partially consisted of relaxing capital requirements for incorporating a firm. Our main contribution is to exploit detailed, third-party reported data on the entrepreneurs behind the incorporation that provides proxies for ability along several dimensions (e.g., education, cognitive ability, and past incomes) and data on whether they were previously unincorporated entrepreneurs. Another central contribution (shared with Cui and Wei 2022) is to isolate the effects of a capital requirement reduction from other start-up friendly policies such as easier registration procedures. Further related to our work is Hombert, Schoar, Sraer, and Thesmar (2020) who find no reduction in proxies for entrepreneurial ability following a french reform that limited the downside risk to entrepreneurship. We view our findings as complementary in the sense that we study a reform that relaxes financial barriers as opposed to risk-aversion barriers.

We further contribute to a large and growing literature on financial frictions and entrepreneurship (see, e.g., Herkenhoff, Phillips, and Cohen-Cole 2021, Hvide and Møen 2010, Fracassi, Garmaise, Kogan, and Natividad 2016, Cespedes, Huang, and Parra 2019, An-

dersen and Nielsen 2012, Adelino, Schoar, and Severino 2015, Ring 2023, Schmalz, Sraer, and Thesmar 2017, Hurst and Lusardi 2004, Kerr, Kerr, and Nanda 2015, Corradin and Popov 2015, Chodorow-Reich, Nenov, Santos, and Simsek 2023). In this literature, several papers present results at odds with whether financial frictions matter for entrepreneurship (see, e.g., Hurst and Lusardi 2004, Andersen and Nielsen 2012, Kerr, Kerr, and Nanda 2015, Bos, Breza, and Liberman 2018.) For example, Andersen and Nielsen (2012) find that sole-proprietors who enter entrepreneurship following a liquidity shock underperform. Our findings are not inconsistent with this result due to the potentially large difference between sole-proprietor entrepreneurs and incorporated entrepreneurs (see, e.g., Berglann et al. 2011, Levine and Rubinstein 2017, Bellon, Cookson, Gilje, and Heimer 2021). While several studies document that positive wealth shocks induce entrepreneurial entry, and often improve entrepreneurial outcomes conditional on entry (e.g., Schmalz, Sraer, and Thesmar 2017), these results do not allow us to draw inference on whether the marginal entrant is of high ability. These results could be consistent with lower-quality entrepreneurs entering due to reduced barriers and then, conditional on entry, being able to scale up their business more due to eased financing constraints.

Our paper proceeds as follows. Section 2 introduces a conceptual framework to understand how the reform would affect selection into entrepreneurship. Section 3 discusses the reform and the data. Section 4 provides the reduced-form results and Section 5 provides formal estimates on how the marginal entrepreneurs that entered following the reform differ from the existing entrepreneurs. Section 6 concludes.

2 Conceptual framework

As in Evans and Jovanovic (1989), the entrepreneurial profit function is given by

$$f_i(k_i) = \theta_i k_i^{\alpha_i} - r k_i, \quad (1)$$

where $\theta_i > 0$ is entrepreneurial ability of individual i , $k_i > 0$ is invested capital, which we assume can only be equity, and r is the (opportunity) cost of capital. Unlike Evans and Jovanovic (1989), we allow $\alpha_i \in (0, 1)$, which governs the concavity of the profit function to vary across individuals.

Selection constraint. An individual enters entrepreneurship only if entrepreneurial profits exceed some opportunity cost, s_i , which can be thought of as income from salaried employment:

$$\theta_i k_i^{\alpha_i} - r k_i \geq s_i. \quad (2)$$

A few observations are in order. This selection criteria is possibly violated both for small k_i as well as for large k_i .¹ When $\alpha \rightarrow 1$, the maximal k_i that satisfied the selection criteria tends to infinity. That is, as we approach a linear profit function, if there is any amount of capital that satisfies (2), then more capital is always better. We thus write the selection constraint as

$$k_{min}(\theta_i, \alpha_i, s_i) \leq k_i \leq k_{max}(\theta_i, \alpha_i, s_i). \quad (3)$$

In our setting, the threshold for when investing more leads to a negative payoff net of opportunity costs is of particular interest. This threshold, $k_{max}(\theta_i, \alpha_i, s_i)$, is characterized both by an indifference condition, $\theta_i k_{max}(\theta_i, \alpha_i, s_i)^{\alpha_i} - r k_i = s_i$ and a negative marginal return condition, $f'_i(k_{max}(\theta_i, \alpha_i, s_i)) < 0$.

Capital requirement and financial constraint. We next impose the capital requirement,

$$k_i \geq \underline{k}, \quad (4)$$

and the financial constraint,

$$k_i \leq \ell_i. \quad (5)$$

We think of ℓ_i as a measure of entrepreneurial liquidity. In [Evans and Jovanovic \(1989\)](#), this term is the product of an agent's personal assets and a multiplicative borrow constraint. We can thus write $\ell_i = \lambda_i \cdot a_i$, where a_i is a measure of (observable) liquid assets. We can think of $\lambda_i > 1$ as indicating that the agent can obtain additional funds from either creditors, family, or other investors. We note that the capital requirement and financial constraints interact in the following sense. If ℓ_i is small, then the financial constraint (5) causes the capital constraint (4) to be violated, and i does not become an entrepreneur.

Entry condition. We can summarize the if-and-only-if condition for entry as

$$\underbrace{\ell_i \geq \max\{\underline{k}, k_{min}(\theta_i, \alpha_i, s_i)\}}_{\text{Financial and selection constraints satisfiable}} \cap \underbrace{k_{max}(\theta_i, \alpha_i, s_i) \leq \underline{k}}_{\text{Max size not smaller than capital requirement}}. \quad (6)$$

This shows that lowering the capital requirement, \underline{k} , operates through two channels.

Liquidity-constraint channel. Some low- ℓ_i agents are now able to satisfy the capital constraint (4) and *can* enter. They choose to do so if the minimum-capital selection

¹For example, if we plot $1 \cdot k^{0.5} - 0.5 - 0.75$, we see that the selection constraint is only satisfied for k roughly in the range of 0.1 to 3.9.

requirement $\ell_i \geq k_{min}(\theta_i, \alpha_i, s_i)$ can be satisfied. There are two potential selection implications. First, if ℓ_i is positively correlated with ability, θ_i , we will see an entry of lower-ability entrepreneurs. Secondly, the fact that the minimum-capital selection-requirement is more easily satisfied for high θ types causes new entrants to be those with higher θ_i . For a given amount of capital, higher θ_i implies higher profits, and thus the selection criteria is more easily satisfied.

Small-business-entry channel. Agents for whom \underline{k} goes from above to below $k_{max}(\theta_i, \alpha_i, s_i)$ will now want to enter and do so if the financial constraint can be satisfied. These are the agents for whom satisfying the existing capital requirement would have implied that the selection requirement was violated. In other words, they would have had to invest so much that (due to the concave profit function) the selection criteria would not be satisfied.

The small-business-entry channel selects agents with a low maximal capital level, k_{max} . Since k_{max} is decreasing in both α_i (see Appendix A.2) and θ_i (see Appendix A.1), this channel selects both high-concavity (low- α_i) and low-ability (low- θ_i) agents. Hence, our hypothesis is that lowering the capital requirement induces the entry of either or both low-ability and low-concavity entrepreneurs.

Note that these new entrants need not have lower ability. This channel would operate even if all agents had infinite ℓ_i .

Summarizing the testable hypotheses. The liquidity constraint channel operates through two forces. Allowing low-liquidity entrepreneurs to enter selects positively on ability. However, among low-liquidity agents, average ability may be lower if liquidity and ability are correlated. The unambiguous implication of the liquidity channel is that entrants have less ex-ante liquidity. However, this may either be due to less personal liquidity (a_i) or a lower ability to raise additional financing (that is λ_i is low).

The small-business-entry channel predicts that new entrants will have lower ability and (or) more concave profit functions. It does not imply that new entrants have less ex-ante liquidity, although this can be the case if ability or concavity is correlated with liquidity.

3 Data and empirical setting

3.1 Institutional setting

Since the first securities law in 1910, the Norwegian authorities have required that a minimum amount of equity must be injected into any limited liability company upon incorporation. The purpose was to protect creditors' interests (GOV, 2011). Between 1997 and 2011, the equity requirement was NOK 100,000 (\$17,000 using the 2012 exchange rate).

This requirement was lowered to NOK 30,000 (\$5,000) effective January 2012, and the change was formally proposed by the ministry of justice in September 2011 (GOV, 2011). The main driver for change was that Norway wished to offer competitive economic conditions relative to, e.g., the U.K. which did not have a capital requirement,² and to reduce barriers to firm creation.³ Following new EU rules in the early 2000s, firms in EU–EEA countries were free to incorporate in other EU–EEA countries. Becht, Mayer, and Wagner (2008) show that this led to substantial increases in U.K. incorporation originating from high-capital-requirement countries.

There are no specific restrictions on the source of the equity: it can come from the entrepreneurs’ own equity, or debt, or from outside investors. Hence, for our theoretical model to apply, we need to consider personal liquidity as a broad measure of the amount of equity the entrepreneur can furnish for her firm.

To our knowledge, there are no other large changes to the economic conditions surrounding firm creation during 2012. Other reforms or changes might complicate the interpretation of our findings to the extent that these were the relevant changes to which the new entrants responded. The closest reform, to our knowledge, is the removal of an auditing requirement for small firms. Small firms that incorporated in May of 2011 or later could opt to not hire an auditor from incorporation onward. To address the concern that it is this reform that drives our results, our initial analyses study entry rates at the quarterly level. This reveals a sharp increase exactly when the capital requirement was reduced (first quarter of 2012) but no noticeable increase in the third or fourth quarters of 2011 when small firms no longer needed to engage an auditor.

3.2 Data

We draw on comprehensive Norwegian register data that allow us to link firm and entrepreneur characteristics. Data from the business registers (“Virksomhets- og foretaks register”) provide a panel of firm characteristics such as the date when the unique organization number was assigned (i.e., when the firm was incorporated). Data from the role register (“Rolleregisteret”) provide a panel of (de-identified) identifiers for a firm’s proprietor, CEO, and board members. Using the stockholder register (“Aksjonærregisteret”), we see anonymized identifiers of all shareholders (both individuals and other firms) allowing us to link firms with their owners. We obtain data on firms’ financial characteristics from their tax returns (“Næringsoppgave 2”). The firm data primarily cover the years 2004–2018.

We obtain individual characteristics, such as year of birth, from the central population

²Countries that have a capital requirement include Germany, Spain, Denmark, Sweden, and Ireland.

³See Xu (2023) for recent study on the tradeoffs between investor protection and entrepreneurial activity.

register. We obtain information on educational attainment as of 2010 from the national education database. We also include data on, e.g., past incomes, from individuals’ tax returns. Finally, we include de-identified data on individuals’ military enlistment scores. Most males aged 18–19 face mandatory interviews and testing by military enrollment officers. Our data include the cognitive ability scores. Ability is measured on a 1–9 (“Stanine”) scale, calibrated by the authorities such that five corresponds to an IQ of 100 and a unit difference corresponds to an IQ difference of 7.5. We adjust the raw test scores to account for the fact that the test was recalibrated (became stricter) in 1980.⁴

3.3 Definitions and sample selection

To be classified as the entrepreneur behind an incorporated firm, a person must be the CEO and own more than 1% of the shares. In order to link individuals with firms through indirect ownership,⁵ we take the following approach. We first limit our data to ownership links of at least 1% of total shares. For shares owned by a second firm, we rank the owners in that second firm, keep the top 10 owners, remove ownership links < 10%, and assign iterated ownership shares to the individuals who own shares in the second firm. That is, if a person owns 10% of firm A which owns 10% of firm B, then that person owns 1% of firm A. We then aggregate ownership shares at the firm-person-year level, allowing for both direct and indirect ownership. We further aggregate ownership shares at the household (spouses) level.

For sole-proprietorships (“enkeltmannsforetak”), we define the entrepreneur as the proprietor (“innehaver”). For partnerships (“DA” and “ANS”), we select the partner that is also the CEO. If there is no partner-CEO, we select the chair of the board or, alternatively, the vice chair. For foreign-incorporated firms, we do not observe ownership, but assign the registered CEO as the entrepreneur. We identify the founding date from when the organization was assigned a unique organization identifier in the business register (“virksomhets-og foretaksregister”).

Our data contain 327,125 (domestic) incorporation events during 2004–2018. We ignore incorporation events of firms that belong to industry codes typically used by financial holding companies.⁶ This leaves 232,116 incorporations. For 132,052 of the events, we can assign an individual as the entrepreneur, and for 47,566 of the events, the entrepreneur was

⁴For pre-1980 tests, we deduct the mean and add the post-1980 mean. This adjusted score is used when ability is an outcome variable, but not when it is used as a categorical variable in, e.g., histograms.

⁵In 2006, Norway introduced a dividend tax for dividends paid from corporations to private shareholders. This created an incentive to own economically active firms through another LLC in order to postpone realizing dividends.

⁶two-digit NACEs codes 64 and 66 (financial and financial services), three-digit nace codes 681, 682, and 701 (real estate investments, real estate leasing and rental, and headquarter services).

not previously an entrepreneur; i.e., in the previous year, she was neither owner-CEO of an incorporated firm, a sole-proprietor, a CEO or board-member partner in a partnership, or the CEO of a foreign-incorporated firm.

To limit the impact of outliers when we consider firm-level data in levels, we limit (winsorize) revenues, wage costs, and assets to be non-negative and below their 95th percentiles. Profits are winsorized at the 5th and 95th percentiles.

4 Reduced-form results

4.1 The effect on firm creations

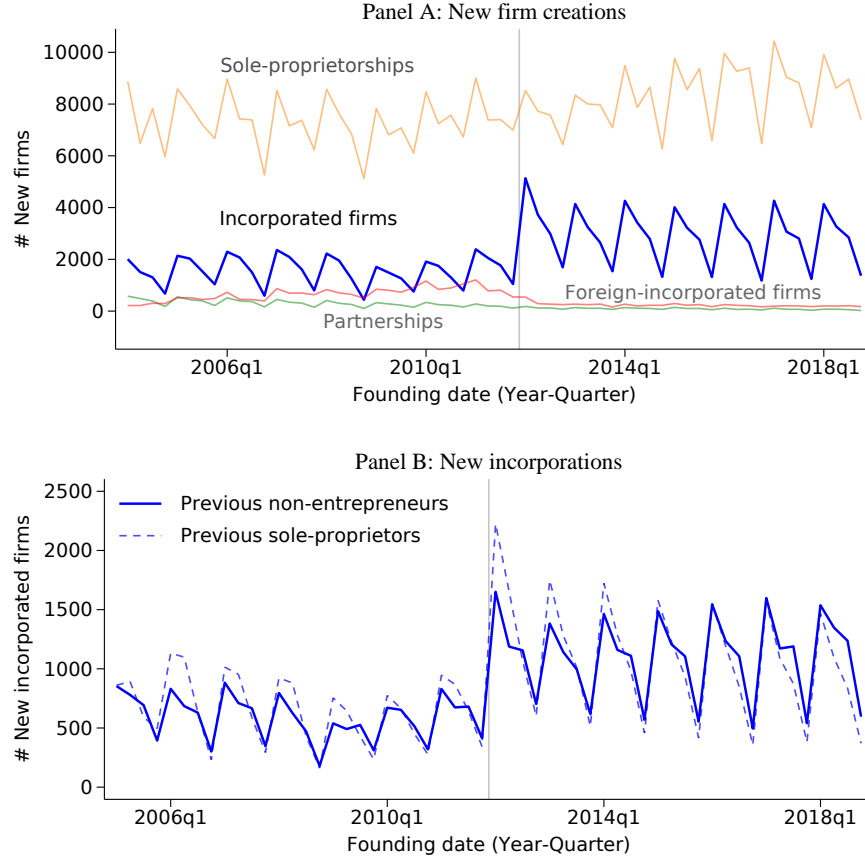
Panel A of Figure 1 shows the number of firm creations over time. We see that immediately after the reform, the number of incorporations immediately doubles and stays at this higher level for the duration of our sample. The immediate response is reasonable, since entrepreneurs who are building a new firm will want to incorporate in order to expense start-up costs for tax purposes: that is, incorporating is likely one of the first steps in the process of establishing a new business.

Since the reform only affected incorporation requirements, and not requirements for establishing a sole-proprietorships (for which there are few), one question is whether the increases annual incorporation rates reflects a substitution away from sole-proprietorships. In principle, would-be entrepreneurs may be trade off the costs and benefits of incorporated versus unincorporated entrepreneurship when selecting legal forms. [Levine and Rubinstein \(2017\)](#), however, hypothesize that there is no such trade off: “true” entrepreneurs either incorporate or do not become entrepreneurs. They further argue that it is the incorporated entrepreneurs, as opposed to sole-proprietors, who drive economic growth. Their hypothesis applied to our setting implies that we should not see a substitution away from sole-proprietorship entries in favor of incorporations as a result of the reform. Interestingly, this is exactly what we find in Panel A. While incorporation rates double, there is no discernible reduction in the amount of new sole-proprietorships.

We further see no effect on partnerships that also do not benefit from limited liability. We do see a reduction in the registration rates of foreign-incorporated firms. Prior to 2012, one way to achieve the benefits of limited liability without having to put up the required amount of equity was to incorporate a limited liability company abroad (often in the U.K., where there were no capital requirements) and then register this company as a foreign-incorporated company (“NUF”) in Norway in order to do business. There were no rules prohibiting firms from taking this approach, even if their business activity was solely based in Norway. Accordingly, as the capital requirement is removed in 2012, we see a reduced

entry of foreign-incorporated firms. This reduction, however, is much too small and arises too early to explain the increase in incorporation rates. This indicates that there were many marginal incorporated entrepreneurs for whom the foreign-incorporation route was not an option.

Figure 1: FIRM CREATION BEFORE AND AFTER THE REFORM



Notes: In Panel A, we condition on being able to assign an entrepreneur to the firm creation (excluding, e.g., subsidiaries of listed companies). In Panel B, the solid blue line considers only incorporations done by individuals who were not previously entrepreneurs: neither incorporated (AS), sole-proprietor (ENK), CEO-partner of a partnership (ANS, DA), or CEO of a foreign-incorporated firm (NUF). The dashed blue line instead considers incorporations done by individuals who were (solely) sole-proprietor entrepreneurs in the previous year.

The increase in incorporations visible in Panel A may be driven by serial entrepreneurs or entrepreneurs who are simply expanding their conglomerates by incorporating new subsidiaries. To understand whether there was in fact an increase in entry into incorporated entrepreneurship, Panel B focuses on firms founded by individuals who were not already entrepreneurs in the previous year: they were neither incorporated entrepreneurs (AS), sole-proprietors (ENK), CEO-partner of a partnership (ANS, DA), or CEO of a foreign-

incorporated firm (NUF). While this reduces the number of incorporations, there is still a noticeable doubling of incorporation dates. These findings indicate that there was a substantial effect on entrepreneurial entry. This conclusion is robust to also dropping any incorporations by entrepreneurs who were non-CEO owners ($\geq 1\%$ of the shares) in any limited liability company in the previous year (see Appendix Figure OA.1).

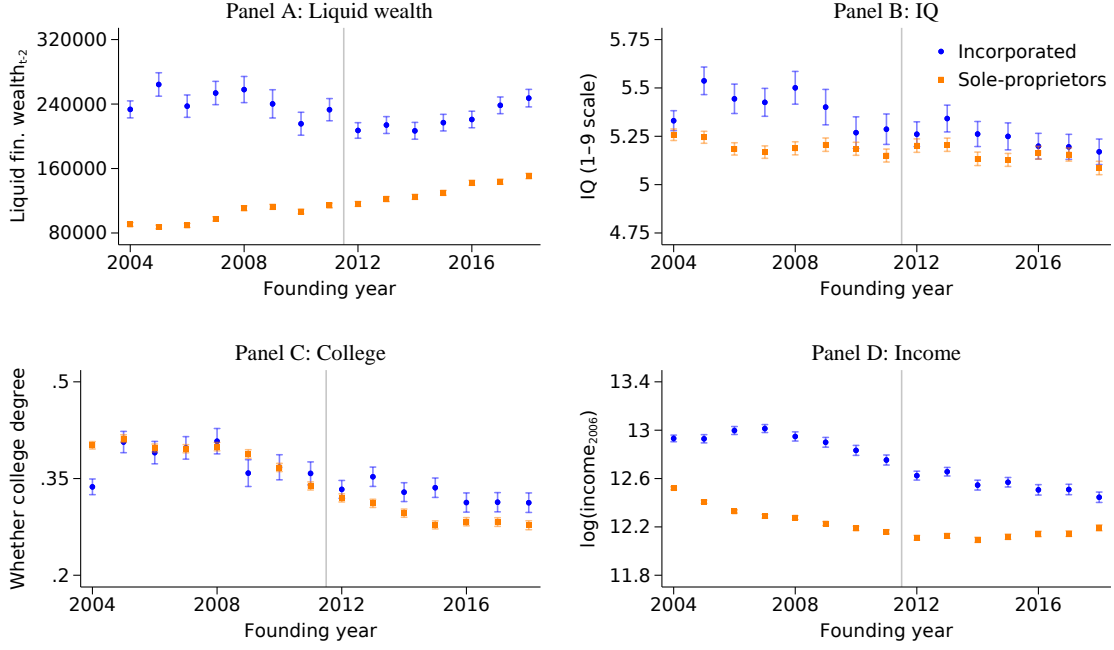
While not part of our subsequent analysis sample, here we also consider incorporations done by individuals who were previously sole-proprietors but not incorporated (or partnership or foreign-incorporated) entrepreneurs. These findings (dashed blue line) reveal a similar effect. This is consistent with there being a large mass of marginal incorporated entrepreneurs in the sole-proprietor population. Our results thus indicate that reducing frictions to incorporations do not affect entry rates into sole-proprietorships but does cause exits—in the sense that existing sole-proprietors choose to incorporate. These findings suggest that adding some nuance to the [Levine and Rubinstein \(2017\)](#) hypothesis may be useful, and perhaps should allow for the notion that sole-proprietorship is a potential pathway to incorporated entrepreneurship.

4.2 The ex-ante characteristics of new entrepreneurs

This section provides graphical reduced-form evidence on how the ex-ante characteristics differ across pre and post-reform incorporations. Later, in section 5, we introduce a simple regression-discontinuity design methodology that allows us to provide more formal estimates.

Studying ex-ante characteristics has two key advantages in identifying differences in ability relative to studying ex-post outcomes such as profitability. The first advantage is that they are not confounded by non-selection treatment effects. Relaxing capital requirements may affect profitability through other channels than a pure selection channel. The second advantage is that ex-post outcomes are affected by the endogenous choice of firm size. Appendix A.3 shows that if the optimal capital amount is an interior solution, profitability is invariant to our key ability measure, θ , and depends non-monotonically on the concavity of the profit function, α . Hence, profitability may be uninformative of entrepreneurial ability.

Figure 2: EX-ANTE CHARACTERISTICS OF ENTREPRENEURS AROUND THE REFORM



Notes: All panels condition on firms created by individuals who were not entrepreneurs in the prior year. Panel A considers military-enlistment cognitive ability scores that are measured on a stanine scale (1 through 9), where 5 is calibrated to correspond to an IQ of 100 and a unit difference in the stanine scale corresponds to an IQ difference of 7.5. Panel B considers a dummy for whether an individual has obtained at least a college degree as of 2010. Income is total taxable personal income measured in 2006 Panel D the liquid financial wealth (stocks, mutual funds, bonds, deposits) of the entrepreneur two years prior. Standard errors underlying the 95% confidence bands are clustered at the person (entrepreneur) level.

Figure 1 shows how the characteristics of new entrepreneurs changed around the time of the reform. We are simply providing the mean characteristics of the entrepreneurs by estimating the following regression equation:

$$y_i = \alpha_{t,n} + \varepsilon_i, \quad (7)$$

where y_i is some characteristic of person i who is not an entrepreneur at time $t - 1$. $\alpha_{t,n}$ are founding year (t) \times firm-type (corporation or sole-proprietorship) fixed effects. ε_i is the error term. Given the large effect on entry rates we observed in the previous section, if marginal entrepreneurs are considerably different from the average entrepreneurs, we would expect to see a change in characteristics shortly after the 2012 reform was enacted. For example, if we expect the marginal entrepreneur to differ on some characteristic, y , by -1 and the reform doubled the number of entrants, we would expect to see a drop in the average y by $\frac{1}{2}$ following the reform. We formalize this logic in Section 5.

Panel A considers liquid financial wealth, which includes bank savings, listed stocks,

bonds, and mutual fund holdings. We measure this two years prior to the creation year. This shows no indication that post-reform entrants have less personal liquidity on average. Another test is whether post-reform entrants were more likely to have particularly low levels of ex-ante liquidity. We find no evidence of this either (see Appendix Figure OA.3).⁷

Panel B considers military-enlistment scores of cognitive ability. The underlying sample largely contains males but does not condition on military enrollment, as virtually all males in our dataset were required to undergo testing at age 18–19 regardless of whether they were selected for military service. We see that incorporated entrepreneurs generally have higher cognitive scores than sole-proprietors. There is some indication that this ability gap narrows over time, but this narrowing does not coincide with the reform in such a way that we would it causally to the 2012 reform.

Panel C considers educational attainment, measured by whether the individual has obtained a college degree or higher as of 2010. Educational attainment is found to be an important predictor of entrepreneurial success (Bates 1990, Queiró 2022). While the average new incorporated entrepreneur after 2012 appears to be less likely to have a college degree, we also see this tendency, and even more so, among unincorporated entrepreneurs. Hence, it does not appear that reducing barriers to incorporation lead to a in-flux of less-educated entrepreneurs.

Panel D considers personal incomes measured in 2006. Personal income is a useful proxy to the extent that entrepreneurial ability and salary-earning ability are correlated (as in, e.g., Hacamo and Kleiner 2022). We see that incorporated entrepreneurs have significantly higher prior incomes than sole-proprietors, but we do not see any tendency that post-reform entrepreneurs had lower ex-ante incomes.

Appendix Figure OA.2 considers age at business creation. Using U.S. data, Azoulay, Jones, Kim, and Miranda (2020) find that the subsequently most successful startups were created by older individuals, suggesting that age may proxy for entrepreneurial ability.⁸ We do find that incorporated entrepreneurs tend to be older by about 6–7 years, but there is no indication that post-reform entrepreneurs were either younger or older.

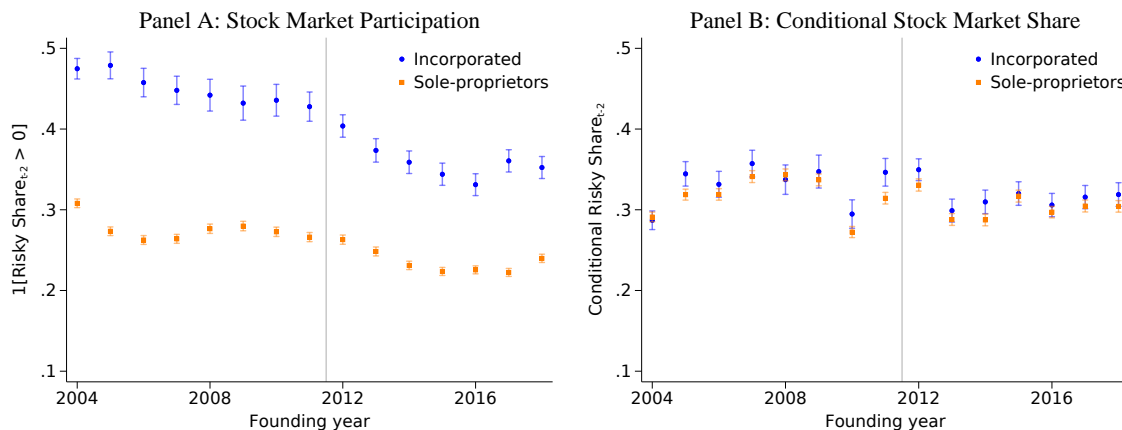
We also examine whether there are differences in entrepreneurial traits among those who transition from sole-proprietor to incorporated entrepreneurship in Appendix Figure OA.5. While we do not see clear evidence that post-reform transitional entrepreneurs were different, the evidence is less conclusive. There appear to be minor falls in IQ and past incomes for those who incorporated right after the reform, in 2012. Through the lens of

⁷Appendix Figure OA.3 shows no indication that those who incorporate after the reform are less likely to have liquid financial wealth above the 25th percentile. This percentile is measured in 2011 and equals NOK 22,400 or about \$3,700.

⁸See also Ouimet and Zarutskie (2014) whose findings suggest the opposite relationship.

our theoretical framework. Not too surprisingly, this mixed evidence suggests that personal assets and ability may be more strongly correlated in the population of sole-proprietors as opposed to in the non-entrepreneurial population.

Figure 3: PORTFOLIO ALLOCATION OF PRE- AND POST-REFORM ENTREPRENEURS



Notes: This figure considers the portfolio allocation of entrepreneurs. We use the same approach as in Figure 2 but left-hand-side variables. Panel A considers stock market participation. That is, whether an individual owns listed stocks or mutual funds. Panel B considers the conditional stock market share: the ratio of listed stocks plus mutual fund holdings divided by listed stocks, mutual fund holdings, deposits, and bond holdings, which is only defined for those who participate in the stock market. For both Panels A and B we measure the outcome variable two years prior to the founding date.

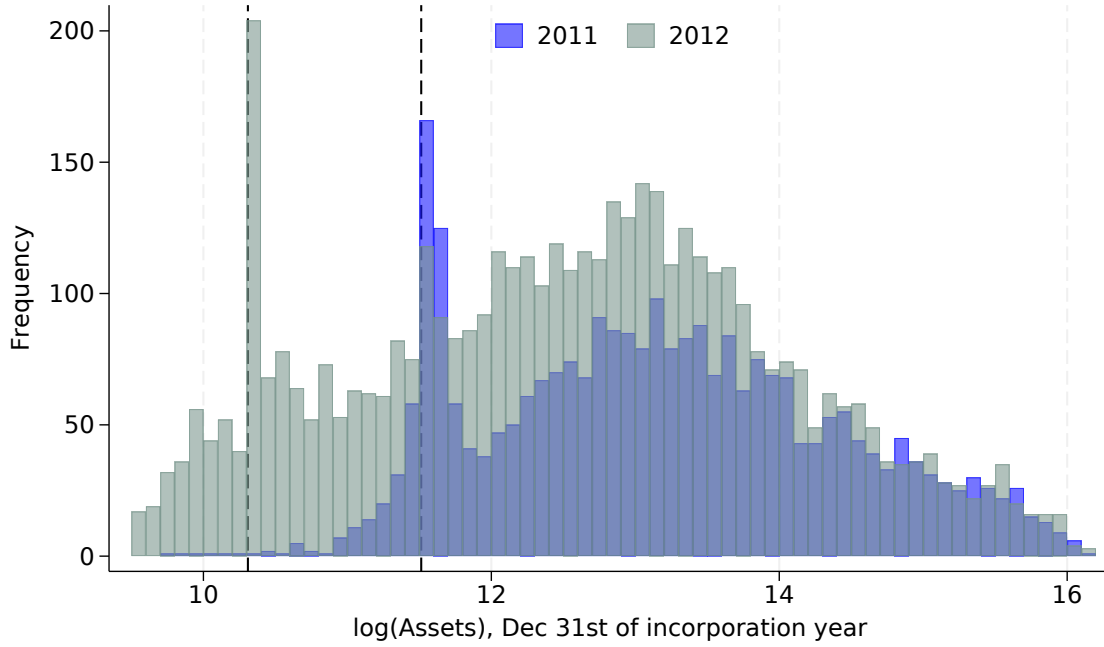
We finally examine whether pre- and post-reform entrants differ in terms of their ex-ante portfolio allocation. The stock market share of financial wealth may proxy for two relevant entrepreneurial characteristics: financial sophistication and risk aversion. While these are hard to disentangle, one intuitive way is to consider participation and the conditional stock market share separately. We provide these findings in Figure 3. Panel A shows no evidence that post-reform entrants are less likely to be invested in the stock market prior to incorporating. While there is a downward trend following the reform, there decrease is not consistent with the sharp increase in incorporations we documented in Figure 1. The most striking finding is that incorporated entrepreneurs are substantially more likely than sole-proprietors to be stock market participants prior to entry.

In Panel B, we consider the conditional stock market share. The idea is that the stock market share is a better proxy for risk aversion when removing the participation-margin. The findings here are striking in the sense that incorporated and sole-proprietor entrepreneurs have virtually identical stock market exposure conditional on participation. We see no evidence of a change in the stock market share for entrepreneurs incorporating after the reform, which suggests that pre- and post-reform entrants do not differ on this proxy for risk aversion.

4.3 Firm-level outcomes

A natural consequence of lowering the capital requirement is the entry of smaller firms. We assess this by considering the distribution of firm assets for firms that incorporated right before and right after the reform in Figure 4. This reveals virtually no effect on the right tail of the distribution for whom the capital requirement does not bind either before or after the reform. However, we find a large change in the left tail of the distribution, including a substantial mass of very small firms with assets below NOK 60,000 (\$10,000). Prior to the reform there were no firms that were this small in terms of assets.

Figure 4: DISTRIBUTION OF ASSETS AT INCORPORATION BEFORE AND AFTER THE REFORM



Notes: We plot the distribution of (log) total assets for 2011 and 2012, truncated to restrict the x-axis. The vertical lines indicate the capital requirements for 2012 and 2011, respectively. Note that it is possible to have less assets than (paid-in-capital) equity in the incorporation year, due to, e.g., negative retained earnings. The 2011 mean of $\log(\text{Assets})$ is 13.24 and the mean for 2012 is 12.49.

We proceed by examining whether post-2012 incorporated firms differ in terms of financial characteristics, such as profitability, measured at the end of our sample period. We do this by estimating the following regression equation:

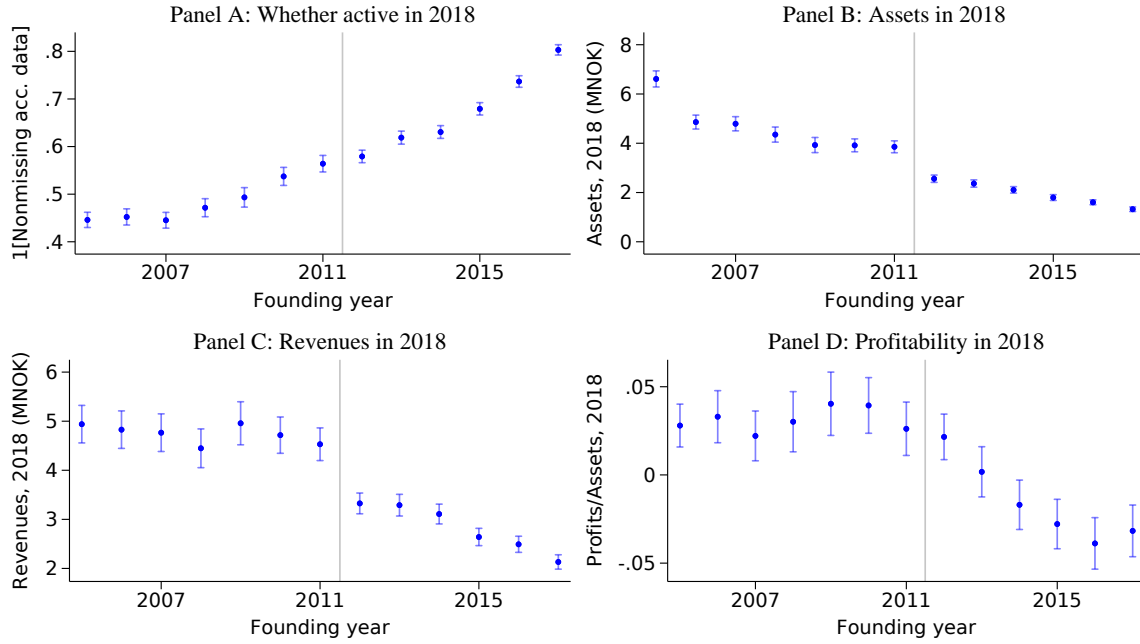
$$y_{f,2018} = \alpha_t + \varepsilon_f, \quad (8)$$

where $y_{f,2018}$ is the outcome variable of interest, α_t are incorporation-year fixed effects, and

ε_f is the error term. We drop firms incorporated in 2018 from our regressions to ensure that all firms were active for the entire year that the outcome variable was recorded.

We present our findings in Figure 5 which considers different outcomes measured in 2018. Panel A considers whether a firm is active, measured by whether it has nonmissing accounting data in 2018. This reveals no indication of post-2012 firms being less likely to be economically active.

Figure 5: FIRM OUTCOMES, CONTRASTING PRE- AND POST-REFORM ENTRANTS



Notes: All panels condition on firms incorporated by individuals who were not entrepreneurs in the prior year. Panel A considers whether the firm has nonmissing accounting data in 2018. Panel B considers the total book assets (winsorized at the 95th percentile) and panel C considers the total revenues (also winsorized at the 95th percentile), and panel D considers profitability. Profitability is measured as $\min(\max(\frac{\text{Operating profits}}{\text{Assets}}, -1), 1)$. All variables are measured in 2018. Standard errors underlying the 95% confidence bands are clustered at the person (entrepreneur) level.

Panel B considers total book assets, and find a sharp difference. Post-2012 firms have about \$200,000 (MNOK 1.25) less assets. This difference is considerably larger than the reduction in the capital requirement from \$17,000 to \$5,000. This indicates that the reform did only reduce the amount of equity in firms but also other liabilities. We decompose and discuss the balance sheet effects in more detail in section 5.3.

Appendix Figure OA.7 verifies that the size differences occur at incorporation. At the end of the founding year, post-reform firms are about \$100,000 (NOK 600,000) smaller in terms of assets. While this shows that the differential in the level of assets increases over time, firms incorporated after the reform do not have lower growth rates. In the three year

period following the incorporation year, both pre and post-reform entrants have similar asset and revenue growth rates of about 6%.

We also find that marginal firms are smaller in terms of revenues. Panel C exhibits a sharp reduction in revenues for firms incorporated in 2012 and onward. The difference is approximately \$170,000 (NOK 1,000,000). Despite the clear evidence that the marginal firms are smaller, our analysis does not indicate that they are less profitable.

Panel D considers profitability (operating income divided by book assets) in 2018, which shows no indication that firms that entered after the capital requirement reduction are less profitable, which is intuitively consistent with our findings of no material differences between marginal and average entrepreneurs in terms of cognitive ability or educational attainment.⁹

As an alternative measure of productivity, we follow [Lichtenberg and Siegel \(1990\)](#), [Bertrand and Mullainathan \(2003\)](#), and [Giroud and Mueller \(2015\)](#) in using the amount of revenues that the firm generates that cannot be explained by its use of inputs. We present these findings in Appendix C.1. This reveals no indication that post-reform entrants are less productive. In contrast with our findings on productivity, there is also no downward trend following the 2012 reform.

One question is whether the lower capital requirements caused increased entry into industries typically populated by smaller firms. To understand whether this is an important mechanism behind our findings, Online Appendix Figure OA.6 repeats the analyses in Figure 5 while including 5-digit NACE industry code fixed effects in the regression equations. This reveals quantitatively similar results.

The purpose of our analyses on firm outcomes is to examine whether lower capital requirement facilitated the entry of different firms and entrepreneurs. However, there is an important caveat in that this selection effect cannot be cleanly identified due to potential treatment effects of the reform. That is, by imposing less binding constraints on the firm's financing mix (i.e., requiring less equity), some entrepreneurs may be able to optimally choose to commit less personal wealth and thus perform better.¹⁰

4.4 Entrepreneurial income

We next explore whether there are differences in realized entrepreneurial income, defined as the sum of personal income (salary, dividends, realized capital gains, sole-proprietor

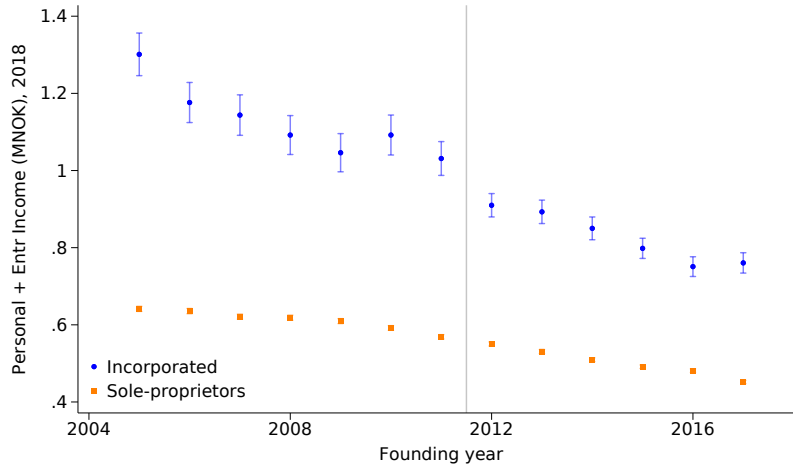
⁹Intuitively, if post-2012 entrants have lower entrepreneurial ability, we would expect to see that their firms are less profitable. This is not the case in our model, however. Appendix A.3 shows that profitability (profits divided by capital) only depends on α_i when k^* is chosen optimally. We further show that profitability is nonmonotonic in α_i .

¹⁰For example, forcing a risk-averse entrepreneur to put up more equity may cause the entrepreneur to undertake fewer high-return high-risk projects.

income) and allocated retained earnings.¹¹

There are at least two reasons for why we might expect that post-reform entrants have lower entrepreneurial incomes. First, if entrepreneurial activities spawned by nonpecuniary motives tend to require less capital, we may expect an increased inflow of non-pecuniarily-motivated entrepreneurs. Second, if new entrants are of lower ability, they may generate less cash flows that they can allocate to themselves either via wages or capital income. We report our findings in Figure 6, which suggests a drop in income of about NOK 100,000 (\$17,000). This drop is not sharp in the sense that there is a clear discontinuity in 2012. However, finding lower entrepreneurial income is consistent with our previous findings. The fact that post-reform entrants have lower assets but similar profitability should imply that they earn less profits. The lack of a sharp drop in entrepreneurial incomes may be explained by retained earnings (and thus profits) accounting for a relatively small share of total income and that the salaries entrepreneurs pay themselves are similar across cohorts.¹²

Figure 6: ENTREPRENEUR'S INCOME, CONTRASTING PRE- AND POST-REFORM ENTRANTS



Notes: All panels condition on firms incorporated by individuals who were not entrepreneurs in the prior year. Scatter points come from estimating the following regression equation: $\text{personal income}_{i,2018} + \text{allocated retained earnings}_{i,2018} = \alpha_{t,n} + \varepsilon_i$, where t indexes firm type $\in \{\text{incorporated, sole-proprietorship}\}$. The left-hand-side variable is winsorized at the 1% and 99% levels. If an individual who starts a firm in t is no longer an entrepreneur in 2018, the left-hand-side variable only contains personal income as observed in the tax returns. Allocated retained earnings $_{i,2018}$ equal $\sum_f \text{ownership share}_{i,f,2018} \times (\text{net income}_{f,2018} - \text{dividends}_{f,2018})$. Standard errors underlying the 95% confidence bands are clustered at the person (entrepreneur) level.

¹¹We allocate retained earnings using the entrepreneur's ownership share, and we allocate earnings from all firms in which the individual is an owner)

¹²The mean share of allocated retained earnings relative to total entrepreneurial income is 1.9%, and the 10th and 90th percentiles are -8.8% and 26.4%.

5 Estimates on how marginal entrepreneurs are different

The previous section provides our main findings graphically on how post-reform entrants differ from pre-reform entrants. This section maps these pre-post differences into estimates of how marginal entrepreneurs (those who only entered due to the reform) differ from the average entrepreneur (who would have entered regardless). The underlying assumptions are that (i) the post-reform increase in entrepreneurship rates is entirely caused by the entry of marginal entrepreneurs and (ii) any change in the average characteristic of entrants from before to after the reform is fully attributable to the entry of marginal entrepreneurs.

5.1 Empirical framework

Differences in average traits of post and pre-reform entrants. We assume that there are two types of entrepreneurs, e : always entrepreneurs, A , and marginal entrepreneurs, B . Post-reform there are $N_{post} = N_A + N_B$ entrepreneurs and pre-reform there are $N_A = N_{pre}$. We only consider *entrants*, not existing entrepreneurs. Pre-reform, the average characteristic of entrepreneurs is given by

$$\bar{Y}^{pre} = \frac{1}{N_A} \sum_{i \in A} Y_i. \quad (9)$$

Post-reform, the average characteristic is given by

$$\bar{Y}^{post} = \frac{1}{N_A + N_B} \left(\sum_{i \in A} Y_i + \sum_{i \in B} Y_i \right). \quad (10)$$

This implies (see Online Appendix B for a derivation) that

$$\frac{\bar{Y}^{post} - \bar{Y}^{pre}}{\frac{N_{post} - N_{pre}}{N_{post}}} = \frac{1}{N_B} \sum_{i \in B} Y_i - \frac{1}{N_A} \sum_{i \in A} Y_i, \quad (11)$$

which says that the pre versus post-reform difference in means divided by the growth rate of the number of firms (relative to the new total—not the existing one) equals the difference in mean characteristics of the two types of entrepreneurs. Equation (11) can be used the following way. If we find that the pre-post difference in some characteristic is 1, and the number of incorporations go from 2 to 3, then the difference (in means) is $\frac{1}{1/3} = 3$.

We estimate the denominator of the left-hand-side of equation (11) by way of a regression discontinuity design. This RDD approach essentially formalizes the criteria we used in Section 4: we are more comfortable assigning causality if any effects materialize sharply following the reform and do not appear to be driven by time trends. Our estimate of

$\bar{Y}^{post} - \bar{Y}^{pre}$ is $\hat{\beta}^Y$ from estimating the regression equation

$$Y_i = \alpha + \beta^Y \mathbb{1}[s \geq 2012] + \gamma^- \times s \times \mathbb{1}[s < 0] + \gamma^+ \times s \times \mathbb{1}[s \geq 0] + \varepsilon_i, \quad (12)$$

where Y_i is a characteristic measured in year h , and s is the founding year, normalized to be zero in 2012. To limit the influence of non-linear long-run time trends, we limit the sample to incorporations done within 3 years of the reform, that is during 2009–2014.

The related estimator for the growth rate, $\frac{N_{post} - N_{pre}}{N_{post}}$ is simply $\frac{N_{2012}^Y - N_{2011}^Y}{N_{2012}^Y}$, where this growth rate is based only on incorporation events for which Y is observable.¹³ The choice of a simple estimator for the increase in entry is due the graphical evidence in Figure 1 that shows no evidence that the 2011–2012 jump was related to overall trends. Hence, we our estimator is

$$\widehat{\Delta Y}_h = \frac{\hat{\beta}^Y}{\frac{N_{2012}^Y - N_{2011}^Y}{N_{2012}^Y}}, \quad (13)$$

where we obtain standard errors from a 200-repetition bootstrap procedure.

5.2 Estimated differences

Table 1 provides our formal estimates from equation (13). Panel A considers ex-ante characteristics of the entrepreneurs. All differences are statistically insignificant, consistent with the graphical evidence in Figure 2. These estimates allow us to rule out that, for example, marginal entrepreneurs have IQs that are more than 0.16 stanine points less than the average entrepreneur.¹⁴ This translates into a an IQ (100 scale) difference of 1.2, which suggests that we have sufficient statistical power to rule out material differences in cognitive ability.

Panel B considers ex-post outcomes. We estimate large differences in proxies for entrepreneurial size: assets, revenues, and the total wage bill of the firm. The marginal entrepreneur creates firms that are about 1.25 MNOK (32%) smaller in terms of assets, 0.96 MNOK (21%) smaller in revenues, and 0.26 MNOK (22%) smaller in terms of labor costs.

The differences in sample size (columns 1 and 6 versus the rest) are driven by data availability (e.g., firm exits cause missing values). Entrepreneurial income is still defined at the person level if the firm no longer exists, in that case we allocate zero retained earnings from the firm. Missing values for entrepreneurial income would arise if the person has no

¹³That is, incorporation events that were followed by exits before $Y_{i,h}$ was measured (e.g., profitability in 2018) do not count toward the growth rate.

¹⁴0.192-1.96*0.178

Table 1: HOW THE MARGINAL AND AVERAGE ENTREPRENEURS DIFFER

Notes: This table provides estimates of how marginal entrepreneurs differ from average entrepreneurs: The first three rows are the estimated coefficients from equation (12), the fourth row is the growth rate in incorporations in the sample where the outcome variable is observed, the fifth row provides the estimated ΔY_h , which is our main estimate. Panel A considers ex-ante traits of entrepreneurs: total personal income in 2006, age at incorporation, whether a college degree in 2010, and their military-enlistment cognitive ability (1–9 stanine) score. Panel B considers ex-post outcomes measured in 2018. Wages are the total wage bill (labor costs) for the firm. Entrepreneurial income is the sum of personal taxable income (e.g., salaries, capital income, sole-proprietor income) and allocated retained earnings. \bar{Y}_{2011} is the outcome-variable sample mean for 2011. Standard errors are obtained from a 200-repetition bootstrap procedure.

Panel A: Ex-ante characteristics						
	(1)	(2)	(3)	(4)		
	log(Personal Income)	LFW (NOK)	College	IQ (1–9)		
$\bar{Y}^{post} - \bar{Y}^{pre}$	-0.037 (0.034)	-15197 (11528)	-0.020 (0.015)	0.072 (0.066)		
$\frac{N_{2012} - N_{2011}}{N_{2012}}$	0.383*** (0.014)	0.408*** (0.015)	0.392*** (0.015)	0.376*** (0.019)		
$\widehat{\Delta Y}$	-0.096 (0.090)	-37252 (28449)	-0.052 (0.038)	0.192 (0.178)		
N	20567	22784	21239	13174		

Panel B: Ex-post outcomes, 2018						
	(1)	(2)	(3)	(4)	(5)	(6)
	Profitability	1[Nonmissing Accounting]	Assets (MNOK)	Revenues (MNOK)	Wage bill (MNOK)	Entr. Income (MNOK)
$\mathbb{1}[s \geq 2012]$	0.00 (0.01)	-0.02 (0.01)	-1.25*** (0.19)	-0.96*** (0.28)	-0.26*** (0.07)	-0.12** (0.04)
$\frac{N_{2012} - N_{2011}}{N_{2012}}$	0.43*** (0.02)	0.42*** (0.01)	0.43*** (0.02)	0.43*** (0.02)	0.43*** (0.02)	0.41*** (0.01)
$\widehat{\Delta Y}$	0.00 (0.03)	-0.04 (0.04)	-2.90*** (0.46)	-2.23*** (0.66)	-0.60*** (0.17)	-0.30** (0.09)
N	13739	23798	13877	13877	13877	22898
\bar{Y}_{2011}	0.03	0.56	3.86	4.53	1.17	0.94

reported personal taxable income (e.g., due to death).

5.3 Balance Sheets at incorporation

We find that post-reform firms are considerably smaller than pre-reform firms in terms of assets. Table 2 decomposes this effect by considering different types of assets as well as liabilities in the year of incorporation. Note that $\widehat{\Delta Y}$, in this setting, is likely biased,

since always-entrepreneurs (who would enter even if no capital requirement reduction) may also be responding to the reform by choosing a more levered capital structure.¹⁵ Hence, we focus our discussion on the simple pre-post reform difference.

Panel A considers the asset side of the balance sheet. We see that pre and post-reform firms differ on all types of assets. The largest difference is found for property, plant, equipment, and vehicles, which explains 20% of the total difference.

Table 2: THE BALANCE SHEETS OF MARGINAL ENTREPRENEURS AT INCORPORATION

Notes: This table provides estimates of how marginal entrepreneurs differ from average entrepreneurs: The first three rows are the estimated coefficients from equation (12), the fourth row is the growth rate in incorporations in the sample where the outcome variable is observed, the fifth row provides the estimated ΔY_h , which is our main estimate. All variables are measured at the end of the year of incorporation. Intangible assets consists of R&D assets, patents, goodwill and similar. PPEV is plant, property, equipment, and vehicles. REI is real-estate investments, Subsid is equity and debt in subsidiaries or affiliated companies. FA Secur is unlisted and listed securities. AP is accounts payable. CA Secur consists of listed securities. Cash is cash and bank deposits. On the liability side, taxes consist of unpaid VAT and income tax liabilities. Bank/bonds consist of bonds, debt to banks and other traded debt securities. Affil consists of debt to affiliated or parent companies. Standard errors are obtained from a 200-repetition bootstrap procedure. Standard errors are obtained from a 200-repetition bootstrap procedure.

Panel A: Assets in year of incorporation, Million NOK										
	Total	Fixed Assets						Current Assets		
		Intang	PPEV	REI	Subsid	Secur	Other	AP	Secur	Cash
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\mathbb{1}[s \geq 2012]$	-0.60*** (0.08)	-0.03*** (0.01)	-0.12*** (0.04)	-0.06*** (0.02)	-0.06** (0.03)	-0.05*** (0.02)	-0.02 (0.01)	-0.10*** (0.03)	0.00 (0.01)	-0.09*** (0.03)
$\widehat{\Delta Y}$	-1.41*** (0.20)	-0.08*** (0.03)	-0.28*** (0.09)	-0.14*** (0.05)	-0.13** (0.06)	-0.13*** (0.04)	-0.04 (0.03)	-0.25*** (0.07)	0.01 (0.03)	-0.20*** (0.06)
N	20968	20968	20968	20968	20968	20968	20968	20968	20968	20968

Panel A: Liabilities in year of incorporation, Million NOK									
	Total	Equity		Debt					
		Paid-in	Retained	Taxes	Banks/Bonds	Suppliers	Wages	Affil	Other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\mathbb{1}[s \geq 2012]$	-0.60*** (0.08)	-0.11*** (0.03)	-0.04 (0.03)	-0.03*** (0.01)	-0.18*** (0.00)	-0.06*** (0.02)	-0.01** (0.03)	-0.06*** (0.02)	-0.12*** (0.03)
$\widehat{\Delta Y}$	-1.41*** (0.20)	-0.27*** (0.06)	-0.08 (0.06)	-0.06*** (0.02)	-0.43*** (0.08)	-0.15*** (0.06)	-0.02** (0.01)	-0.15*** (0.05)	-0.29*** (0.08)
N	20968	20968	20968	20968	20968	20968	20968		

¹⁵All post-reform entrants may now choose to provide less equity at incorporation. This should lead to an upward bias on the point estimates for the debt components and a negative bias for equity.

Panel B considers the liability side of the balance sheet. Here, we find that post-reform entrants have \$18,000 (NOK 110,000) less in paid in capital (PIC). Where the 95% confidence interval contains the statutory change of \$9,000. Interestingly, we also find that post-reform entrants have about \$30,000 less in financial debt (banks, bonds, etc). Dividing the difference in financial debt by the difference in PIC gives a sizable multiplier of 1.7.¹⁶

Column (8) of Panel B provides differences in debt to affiliated parties (such as firms in the same conglomerate or equity holders). Here, we would have hypothesized a *positive* difference. This is due to the fact that owners (either directly or via intermediate companies) have, following the reform, more room to substitute equity for debt financing, which is more liquid. In principle, the entire reduction in PIC could have been driven by owners financing their firms with more debt instead of equity, but this is not what we find.

In Appendix Table OA.1, we consider the differences as of 2018 and find roughly similar patterns, although here revenue-dependent assets such as accounts payable are more important.

6 Discussion

We provide new evidence on how selection into entrepreneurship is affected by a reform that lowered the financial requirements to incorporate. We show that new entrepreneurs were not different in terms of past income, cognitive ability, or education levels. This suggests an absence of a quality-quantity trade-off in facilitating entrepreneurship by relaxing financial entry requirements. We further document that new entrants do not have lower ex-ante liquidity. This indicates that these entrepreneurs are not responding to relaxed liquidity constraints. Our model then suggests that the key channel is increased entry of optimally-small businesses. Consistent with this, we find that new firms are considerably smaller but do not differ in terms of growth rates. We further find no evidence that new entrants are less profitable or less likely to survive.

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¹⁶Note that this multiplier is likely downward biased. This is due to the fact that many “always-entrepreneurs” may have wanted to choose a higher debt to equity ratio before 2012 but were only able to after the equity requirement was lowered in 2012.

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Online Appendix

A Derivations for conceptual framework

A.1 Max k that satisfies selection criteria is increasing in θ

$k_{max}(\theta_i, \alpha_i, s_i)$ is increasing in θ_i . k_{max} is defined by $\theta_i k_{max}^{\alpha_i} - r k_{max} - s = 0$. If we differentiate this with respect to θ_i , we obtain

$$\frac{dk_{max}}{d\theta_i} = \frac{-k_{max}^{\alpha_i}}{\theta_i \alpha_i k_{max}^{\alpha_i-1} - r} = \frac{-k_{max}^{\alpha_i}}{f'(k_{max}^{\alpha_i})}, \quad (14)$$

which is positive since $f'(k_{max}^{\alpha_i})$ must be negative. Otherwise, we would want to increase capital above $k_{max}^{\alpha_i}$.

A.2 Max k that satisfies selection criteria is increasing in α

$k_{max}(\theta_i, \alpha_i, s_i)$ is increasing in α_i :

k_{max} is defined by $\theta_i k_{max}^{\alpha_i} - r k_{max} - s = 0$. If we differentiate this with respect to α_i , we obtain

$$\theta_i k_{max}^{\alpha_i} \left[\frac{\alpha_i}{k_{max}} \frac{dk_{max}}{d\alpha_i} + \log(k_{max}) \right] - r \frac{dk_{max}}{d\alpha_i} = 0. \quad (15)$$

We reorganize and get

$$\frac{dk_{max}}{d\alpha_i} = \frac{\theta_i k_{max}^{\alpha_i} \log(k_{max})}{r - \theta_i k_{max}^{\alpha_i-1} \alpha_i} \quad (16)$$

$$= \frac{\theta_i k_{max}^{\alpha_i} \log(k_{max})}{-f'(k_{max})}, \quad (17)$$

which is strictly positive as long as $k_{max} > 1$ due to the fact that $f'(k_{max})$ must be negative (otherwise, k_{max} doesn't exist).

A.3 Profitability

This section shows that profitability measured as profits divided by capital is independent of θ and a nonmonotonic function of α .

Assuming an interior solution, the first-order condition that determines k for $\alpha \in (0, 1)$

is

$$\alpha \theta k^{\alpha-1} - r = 0. \quad (18)$$

Rearranging, we obtain that the optimal capital amount is given by

$$k^* = \left(\frac{\alpha \theta}{r} \right)^{\frac{1}{1-\alpha}}. \quad (19)$$

This implies that profitability (where profits is gross of the opportunity cost of capital) can be written

$$\frac{\theta k^{*\alpha}}{k^*} = \frac{\theta \theta^{\frac{\alpha}{1-\alpha}} \alpha^{\frac{\alpha}{1-\alpha}} r^{-\frac{\alpha}{1-\alpha}}}{\theta^{\frac{1}{1-\alpha}} \alpha^{\frac{1}{1-\alpha}} r^{-\frac{1}{1-\alpha}}} = \alpha^{\frac{2\alpha-1}{1-\alpha}} r^{\frac{1-2\alpha}{1-\alpha}}, \quad (20)$$

which is *nonmonotonic*. Our empirical notion of profits is annual, hence the r should be considered to have the same magnitude as annual required rates of return. If we set $r = 10\%$, then profitability is U-shaped in α with a minimum at $\alpha \approx 0.3$.

B Derivations for empirical specification

$$\frac{1}{N_B} \sum_{i \in B} Y_i - \frac{1}{N_A} \sum_{i \in A} Y_i = \frac{1}{N_B} \left(\bar{Y}^{post} (N_A + N_B) - N_A \bar{Y}^{pre} \right) - \frac{1}{N_A} \sum_{i \in A} Y_i \quad (21)$$

$$= \frac{N_A}{N_B} \left(\bar{Y}^{post} \frac{N_A + N_B}{N_A} - \bar{Y}^{pre} \right) - \bar{Y}^{pre} \quad (22)$$

$$= \frac{N_A}{N_B} \left(\bar{Y}^{post} \frac{N_A + N_B}{N_A} - \bar{Y}^{pre} \left[1 + \frac{N_B}{N_A} \right] \right) \quad (23)$$

$$= \frac{N_A}{N_B} \left(\bar{Y}^{post} \frac{N_A + N_B}{N_A} - \bar{Y}^{pre} \left[\frac{N_A + N_B}{N_A} \right] \right) \quad (24)$$

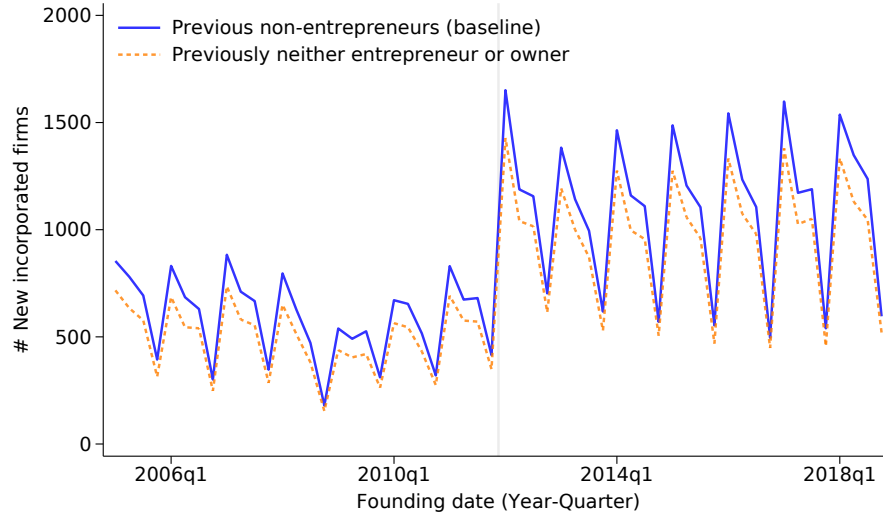
$$= \frac{N_A}{N_B} \left(\bar{Y}^{post} - \bar{Y}^{pre} \right) \frac{N_A + N_B}{N_A} \quad (25)$$

$$= \frac{\bar{Y}^{post} - \bar{Y}^{pre}}{\frac{N_B}{N_A + N_B}} \quad (26)$$

$$= \frac{\bar{Y}^{post} - \bar{Y}^{pre}}{\frac{N_{post} - N_{pre}}{N_{post}}}. \quad (27)$$

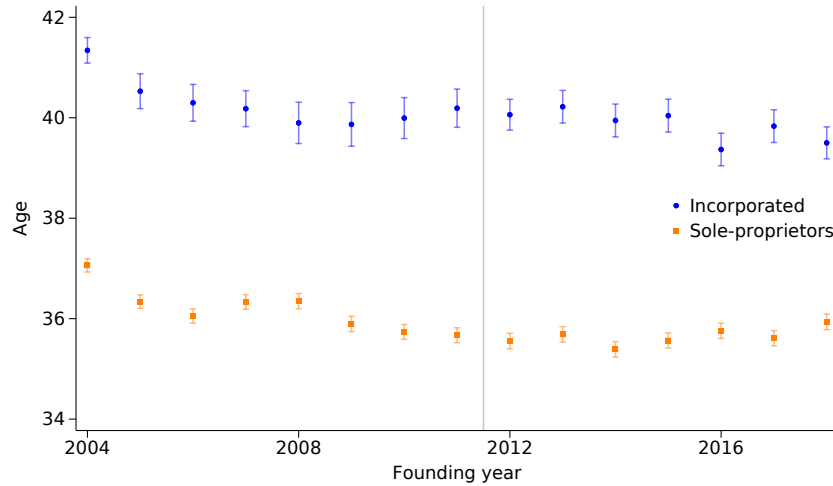
C Supplementary figures

Figure OA.1: FIRM CREATION BEFORE AND AFTER THE REFORM:
EXCLUDING ENTREPRENEURS WHO OWNED ANY PRIVATE EQUITY



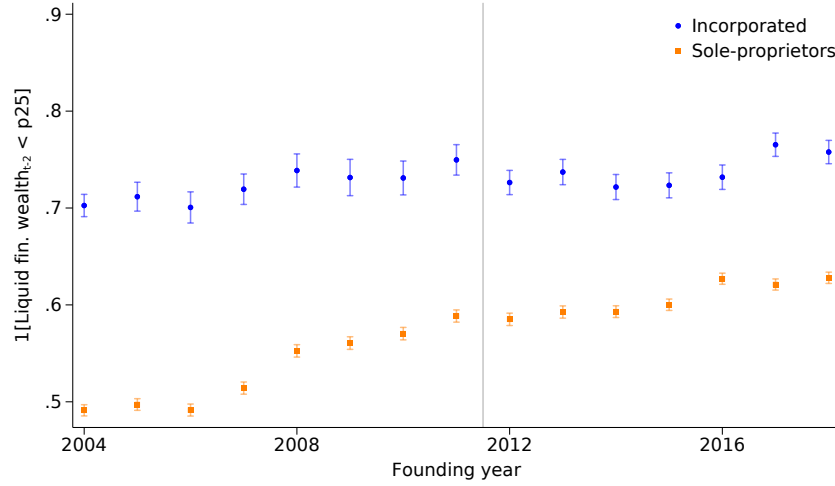
Notes: The solid blue line considers only incorporations done by individuals who were not previously entrepreneurs: neither incorporated (AS), sole-proprietor (ENK), CEO-partner of a partnership (ANS, DA), or CEO of a foreign-incorporated firm (NUF). The dashed orange line restricts the sample to incorporations done by individuals who were not entrepreneurs *nor* did they own $\geq 1\%$ of the shares in any limited liability firm (AS).

Figure OA.2: CHARACTERISTICS OF ENTREPRENEURS AROUND THE REFORM: AGE



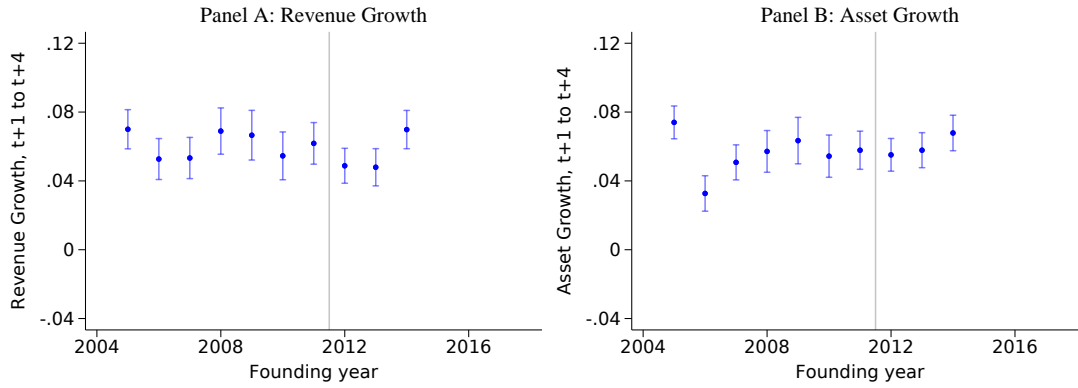
Notes: All panels condition on firms created by individuals who were not entrepreneurs in the prior year. This figure considers the age of the entrepreneur (incorporation year — birth year). Standard errors underlying the 95% confidence bands are clustered at the person (entrepreneur) level.

Figure OA.3: WHETHER ENTREPRENEURS EX-ANTE LIQUIDITY IS ABOVE THE 25TH PERCENTILE



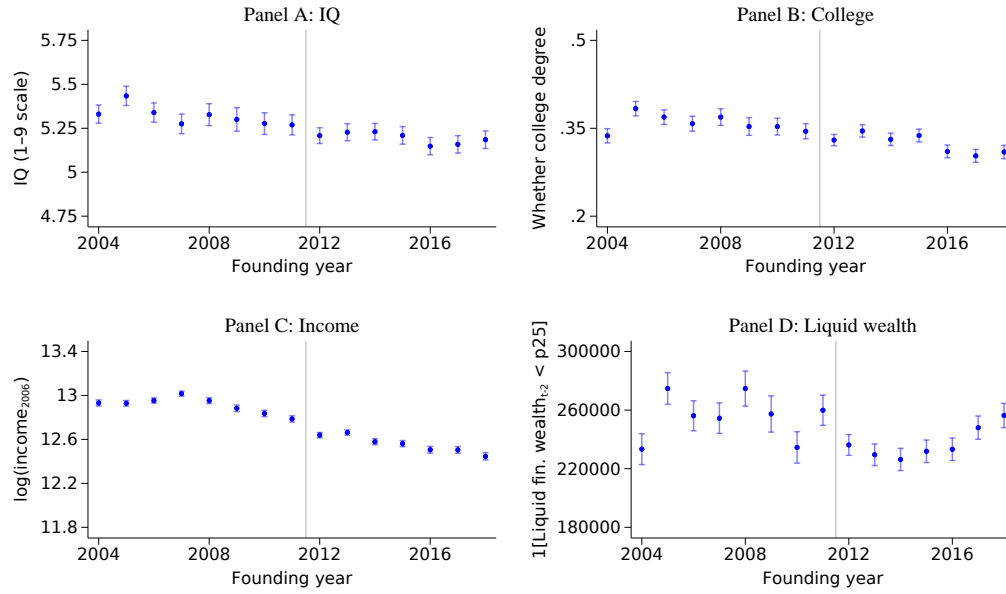
Notes: All panels condition on firms created by individuals who were not entrepreneurs in the prior year. This figure considers whether the entrepreneur's liquid financial wealth is above the 25th percentile (measured in 2011 among incorporating entrepreneurs). Standard errors underlying the 95% confidence bands are clustered at the person (entrepreneur) level.

Figure OA.4: FIRMS' EX-POST OUTCOMES: REVENUE AND ASSET GROWTH IN THE THREE YEARS FOLLOWING INCORPORATION



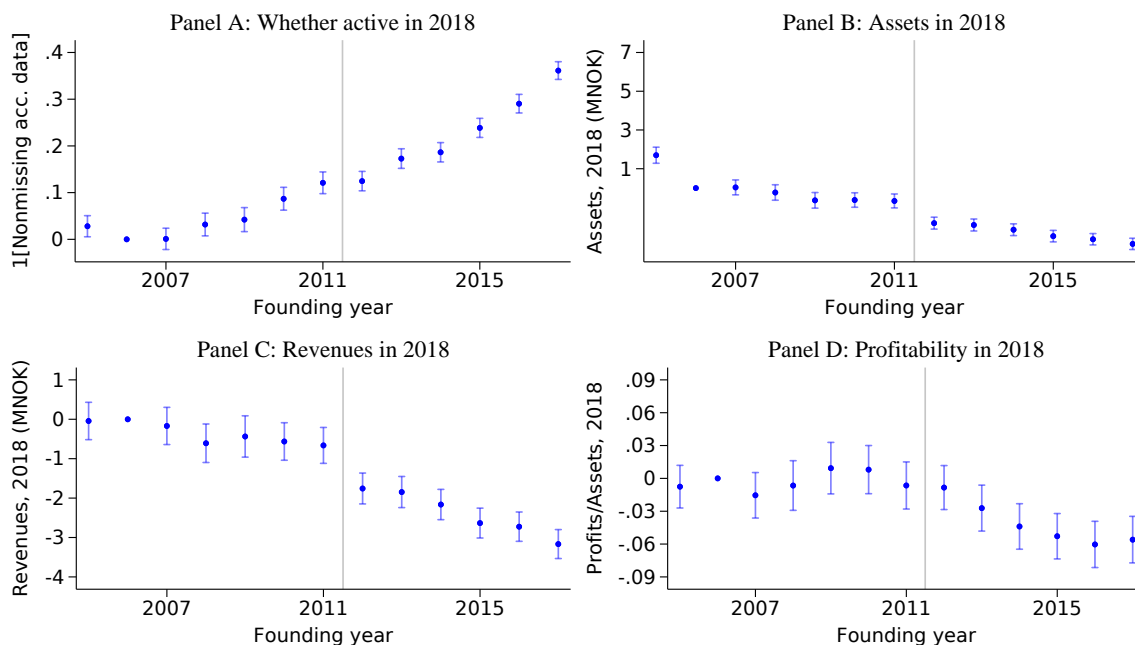
Notes: This figure considers revenue and asset growth in the three-year period after incorporation (from $t+1$ to $t+4$). Revenue growth is measured as the symmetric growth rate and is annualized by dividing the growth rate by 3. We drop observations where the $t+1$ or $t+4$ value is missing or weakly negative. See main text and Figure 5 for further details.

Figure OA.5: CHARACTERISTICS OF ENTREPRENEURS WHO TRANSITION FROM
SOLE-PROPRIETOR TO INCORPORATED ENTREPRENEURSHIP



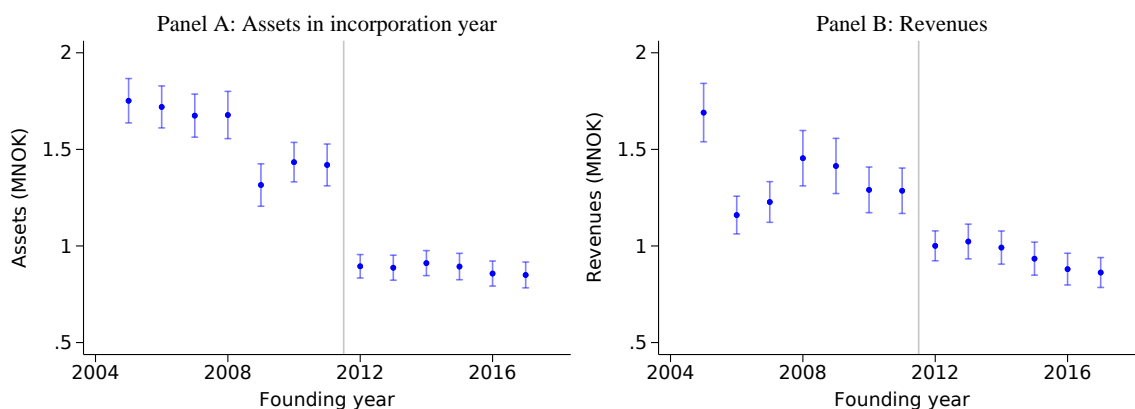
Notes: All panels condition on firms created by individuals who were sole-proprietors but otherwise not entrepreneurs in the previous year. Panel A considers cognitive ability measured on a stanine scale (1 through 9), where 5 is calibrated to correspond to an IQ of 100 and a unit difference in the stanine scale corresponds to an IQ difference of 7.5. Panel B considers a dummy for whether an individual has obtained at least a college degree as of 2010. Income is total taxable personal income measured in 2006 Panel D considers liquid financial wealth (stocks, bonds, deposits, mutual fund holdings) measured two years prior. Standard errors underlying the 95% confidence bands are clustered at the person (entrepreneur) level.

Figure OA.6: FIRM OUTCOMES, CONTRASTING PRE- AND POST-REFORM ENTRANTS WHILE CONTROLLING FOR INDUSTRY FIXED EFFECTS.



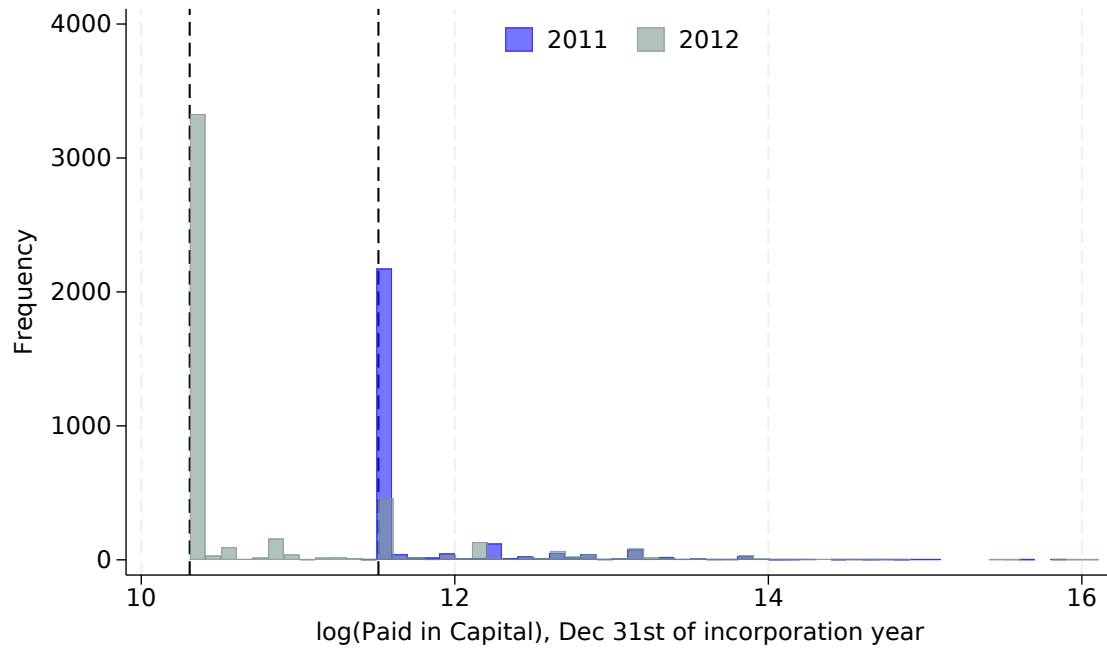
Notes: In contrast to Figure 5, the following regression estimates are the result of also controlling for the incorporated firms' 5-digit NACE industry codes. All panels condition on firms incorporated by individuals who were not entrepreneurs in the prior year. All variables are measured in 2018. Standard errors underlying the 95% confidence bands are clustered at the person (entrepreneur) level.

Figure OA.7: ASSETS AND REVENUES RIGHT AFTER INCORPORATION



Notes: This figure plots how assets and revenues, measured at the end of the incorporation year, varies with the incorporation year.

Figure OA.8: DISTRIBUTION OF EQUITY (PAID-IN-CAPITAL) BEFORE AND AFTER REFORM



Notes: We plot the distribution of (log) Paid-in-Capital for 2011 and 2012, truncated to restrict the x-axis. The vertical lines indicate the capital requirements for 2012 and 2011, respectively.

Table OA.1: THE BALANCE SHEETS OF MARGINAL ENTREPRENEURS IN 2018

Notes: This table provides estimates of how marginal entrepreneurs differ from average entrepreneurs: The first three rows are the estimated coefficients from equation (12), the fourth row is the growth rate in incorporations in the sample where the outcome variable is observed, the fifth row provides the estimated ΔY_h , which is our main estimate. Intangible assets consists of R&D assets, patents, goodwill and similar. PPEV is plant, property, equipment, and vehicles. REI is real-estate investments, Subsid is equity and debt in subsidiaries or affiliated companies. FA Secur is unlisted and listed securities. AP is accounts payable. CA Secur consists of listed securities (e.g., listed stocks, bonds). Cash is cash and bank deposits. On the liability side, taxes consist of unpaid VAT and income tax liabilities. Bank/bonds consist of bonds, debt to banks and other traded debt securities. Affil consists of debt to affiliated or parent companies. Standard errors are obtained from a 200-repetition bootstrap procedure.

Panel A: Assets in 2018, Million NOK										
	Total	Fixed Assets						Current Assets		
		Intang	PPEV	REI	Subsid	Secur	Other	AP	Secur	Cash
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\mathbb{1}[s \geq 2012]$	-1.25*** (0.19)	-0.00 (0.02)	-0.17** (0.08)	-0.17*** (0.06)	-0.17** (0.08)	-0.14*** (0.04)	-0.03 (0.03)	-0.24*** (0.08)	-0.04 (0.05)	-0.17*** (0.06)
$\widehat{\Delta Y}$	-2.90*** (0.46)	-0.00 (0.05)	-0.40** (0.18)	-0.39*** (0.13)	-0.40** (0.19)	-0.32*** (0.10)	-0.07 (0.07)	-0.57*** (0.18)	-0.10 (0.11)	-0.40*** (0.13)
N	13877	13877	13877	13877	13877	13877	13877	13877	13877	13877

Panel A: Liabilities in 2018, Million NOK										
	Total	Equity			Debt					
		Paid-in	Retained	Taxes	Bank/bonds	Suppliers	Wages	Affil	Other	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
$\mathbb{1}[s \geq 2012]$	-1.25*** (0.19)	-0.15*** (0.05)	-0.47*** (0.10)	-0.08*** (0.02)	-0.25*** (0.07)	-0.09** (0.05)	-0.04*** (0.02)	-0.16*** (0.04)	-0.05 (0.06)	
$\widehat{\Delta Y}$	-2.90*** (0.46)	-0.34*** (0.12)	-1.08*** (0.23)	-0.19*** (0.06)	-0.58*** (0.17)	-0.22** (0.11)	-0.10*** (0.04)	-0.36*** (0.09)	-0.12 (0.14)	
N	13877	13877	13877	13877	13877	13877	13877	13877	13877	

C.1 Alternative productivity measure

Following [Lichtenberg and Siegel \(1990\)](#), [Bertrand and Mullainathan \(2003\)](#), and [Giroud and Mueller \(2015\)](#), we use the residuals from regressions of log revenues on log inputs as a

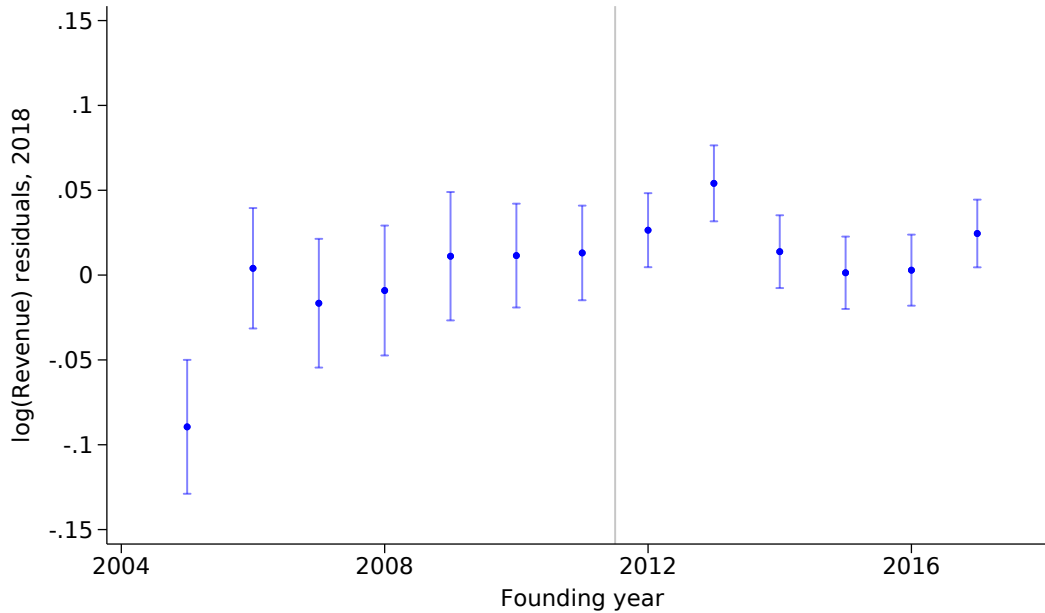
proxy for productivity. More formally, for each 3-digit NACE industry, we estimate

$$\begin{aligned} \log(\text{Revenues}_{f,t}) &= \beta_0 + \beta_1 \log(\text{Assets}_{f,t}) \\ &+ \beta_2 \log(\text{Wage bill}_{f,t}) \\ &+ \beta_3 \log(\text{Operating costs minus payroll tax, depr., and write-downs}_{f,t}) + \varepsilon_{f,t} \end{aligned} \quad (28)$$

and use the estimated $\hat{\varepsilon}_{f,2018}$ as our productivity measure. To allow for zero-wage-bill firms, we shift the log-argument by an inflation-adjusted NOK 10,000.¹⁷ All operating cost components are truncated below at zero. We residualize the productivity measure at the 1st and 99th percentile of the 2018 distribution.

Figure OA.9 reports our findings on how this proxy for productivity in 2018 varies with the year of incorporation

Figure OA.9: FIRMS' EX-POST OUTCOMES: PRODUCTIVITY
MEASURED AS A LOG(REVENUE) RESIDUAL



Notes: This figure considers the 2018 residuals from a regression of log revenues on the log of input factors as the dependent variable. See Appendix C.1 for details on constructing the productivity measure and the main- text and Figure 5 for further details on methodology.

¹⁷Inflation adjustment assumes a constant rate of inflation of 2%.