Entrepreneurs of circumstance: labour market distress and entrepreneurship

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Abstract

I study individuals who become entrepreneurs following an industry downturn using the massive decline in oil prices in 2014 to understand the potential of entrepreneurship as an alternative career path for employees affected by industry downturns. The oil price decline resulted in increased entrepreneurial activity among oil workers in Norway. Compared to new entrepreneurs unaffected by the shock, such 'entrepreneurs of circumstance' tend to originate from lower income levels within their respective companies. These entrepreneurs also run more profitable firms, and the difference in profitability is unique to the cohort of firms started by employees affected by the shock.

1 Introduction

Many industries that employ a large number of workers face the challenge of becoming less relevant or even obsolete due to automation, shifting consumer trends, and an increased focus on sustainability. This means that workers in these industries may experience a decrease in demand for their labour and a decline in the value of their skills in their economy. Can entrepreneurship provide a solution for such mid-career workers affected by an industry decline? The answer to this question depends on the underlying motivation and characteristics of the marginal entrepreneur who starts a firm following a decline in their sector of employment.

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I look at firms that were founded by oil and gas workers in Norway in the aftermath of the oil price drop in 2014. Between January 2011 and August 2014, oil prices were mostly above the $100 mark. In June 2014, the price saw a steep drop reaching under $50 by the end of the year (Figure A.1). This halving of oil prices caused an increase in unemployment in Norway where the oil and gas sector employed almost 84,000 people directly. About 22,000 jobs were eliminated following the decline. The shock, however, was isolated to the sector as the net employment increased by 23,000 during the same period (Hvinden and Nordbø, 2016). This decline in the industry was seen as a permanent adjustment rather than a temporary setback.

Due to the unexpected and sustained nature of the oil price shock, I am able to explore insights about these entrepreneurs of circumstance across two dimensions. Firstly, by comparing entrepreneurs with a background in the oil and gas sector with those without a background in oil and gas with firms within the same industry, I am able to see whether entrepreneurs stimulated by decline in their industry of employment differ in performance compared to other entrepreneurs starting at the same time. Secondly, by then looking at cohorts of entrepreneurs before the oil price dropped, I am able to see whether the decline in industry changed the characteristics of entrepreneurs compared to entrepreneurs coming out of the same sector in previous years.

I use comprehensive data on the population of Norwegian limited liability firms in 2010-2018. I focus on firms newly incorporated before and after the oil price drop and use a difference-in-differences (DD) design to identify how the level of entrepreneurship and future outcomes changed among oil and gas employees around the oil price shock. With detailed data on the individuals' employment history, income, wealth and demographics, I am able to link various individual characteristics to entrepreneurial choices and outcomes.

I show that following the decline in oil prices, more individuals employed in the oil sector were likely to become entrepreneurs in the next two years compared to before the price drop. In the years before the oil price drop, a high salary is linked to a higher likelihood of entry into entrepreneurship. For the cohort affected by the oil price drop, the effect of having a higher salary is significantly lower. This suggests that a shock to labour prospects asymmetrically increased the likelihood of individuals lower down the income distribution to become entrepreneurs.

I find that such 'entrepreneurs of circumstance' start firms that are more profitable than firms in the same industry started by individuals who did not work in oil and gas. Among firms founded in 2015 and 2016, I find that having an owner who used to work in oil leads to a 11.3 pp higher operating return on assets (OROA) controlling for industry, location and founding year fixed effects. This effect is unique to the cohort of entrepreneurs who start firms after the oil price drop and is not present in prior cohorts. The results also show that entrepreneurs coming from a declining industry are different from entrepreneurs who are not affected by the decline. Evidence of successful entrepreneurial outcomes for such employees is encouraging from a perspective of labour allocation, and additionally also attractive because entrepreneurial pursuits by talented individuals has also been linked to faster growth of the local economy (Murphy et al., 1991).

Individuals make a choice between becoming an entrepreneur and becoming (or remaining) an employee based on their expected lifetime earnings from the two choices. Entrepreneurial earnings often also include an unobservable non-pecuniary component which can be vital to the decision (Hamilton, 2000). Even when individuals believe they can earn more from entrepreneurship than employment, they might choose employment for two major reasons. Firstly, financial constraints may limit individuals' ability to make the initial investment required to start a firm (Evans and Jovanovic, 1989). Secondly, highly risk-averse high-ability individuals may discount their expected entrepreneurial earnings more sharply than their expected labour income, thereby making entrepreneurship less lucrative (Kihlstrom and Laffont, 1979). Thus, a combination of factors such as entrepreneurial skill, expectations of labour income, non-pecuniary benefits, financial constraints, and risk aversion can drive entrepreneurial choice.

My findings suggest that during normal times, individuals who have a strong preference for entrepreneurship transition from wage employment to entrepreneurship. This can be attributed to the accumulation of wealth over time, which relaxes the financial constraints that prevent them from starting a firm. As a result, even if the financial returns are not particularly lucrative, these individuals are more likely to pursue entrepreneurship due to their preferences including the non-pecuniary benefits of entrepreneurship. However, a labour market shock affecting an entire sector can make entrepreneurship a viable option for individuals with positive financial prospects, regardless of their preferences regarding

non-pecuniary benefits or risk aversion. I illustrate this with a simple model in section 2.

The increased level of entrepreneurship that I find is consistent with existing evidence relating employment and entrepreneurial choice (Evans and Leighton, 1990; Røed and Skogstrøm, 2014; Berglann et al., 2011). More specifically Berglann et al. (2011), based on Norwegian data, find that unemployed job seekers have a higher probability of becoming entrepreneurs, and underemployed individuals have an even higher probability of doing so. Firm-level distress can limit firms' ability to pursue productive opportunities and push employees towards entrepreneurship. Labour market distress, in a similar manner, can reduce the opportunity cost of entrepreneurship making it more lucrative for individuals to start their own business (Babina, 2020; Hacamo and Kleiner, 2022).

The positive performance of entrepreneurs who start in adverse circumstances documented here is similar to what Hacamo and Kleiner (2022) find in a study of recent college graduates. They find that a recession disproportionately affects the potential top earners, and show that there is untapped entrepreneurial potential at the top of the income distribution. Among mid-career professionals, I find that the situation is different. It is indeed individuals towards the top of the income distribution in their firms that leave their jobs to start firms during normal times. However, during a downturn, I see a disproportionate increase in entrepreneurial activity between the 25th and 75th percentiles in the income distribution within oil and gas firms where these entrepreneurs were previously employed. Following the downward shift in the income distribution of new entrepreneurs because, the performance of these new firms is better than firms founded by oil employees before the shock. Relatively 'poorer' entrepreneurs outperforming the wealthier entrepreneurs is consistent with evidence in the literature that links wealthier entrants into entrepreneurship with worse firm performance (Hvide and Møen, 2010; Nanda, 2012).

My analysis extends the understanding of how the marginal entrant into entrepreneurship performs based on various ways in which individuals are pushed towards entrepreneurship. In addition to findings from Hacamo and Kleiner (2022) regarding college graduates, Andersen and Nielsen (2012) and Schmalz et al. (2017) discuss entrants who become entrepreneurs because of a sudden increase in wealth. I look at mid-career professionals with accumulated sector-specific experience during a sector decline and contrast that with a time period where the sector is growing. I find that the choice of entry as well as subsequent

performance of entrepreneurs during a decline in their sector of employment have important differences. Considering the impact of successful entrepreneurship on job creation and economic growth (King and Levine, 1993a,b), results indicating successful entrepreneurial outcomes for employees pushed by an industry decline can have meaningful implications for policy design. I find some evidence suggesting higher risk aversion among potentially successful entrepreneurs. Limiting the downside risk may enable these risk-averse individuals to start successful firms as documented around a reform in unemployment insurance in France by Hombert et al. (2020).

2 Framework

I propose a simple static framework for entrepreneurial choice based on financial prospects, risk aversion, non-pecuniary benefits, and labour market prospects.

An individual makes a choice between entering (or remaining in) wage employment and pursuing entrepreneurship based on an evaluation of the pay-off from each option. Income from employment is a safe option with a regular salary. Entrepreneurial income incorporates both financial and non-pecuniary benefits.

I define employment income as a growing perpetuity where the individual expects to earn an annual salary S that grows at rate g_L. As this is a safe option, it is discounted at the rate r_f. So, the expected lifetime earnings from wage employment L is:

$$L = \frac{S}{r_f - g_L} \tag{1}$$

The earnings from entrepreneurship are composed of a financial component (F) and a non-pecuniary component (N). For simplicity, I assume that all payments from the firm to the entrepreneur are in the form of dividends. The firm pays the owner a dividend D that grows at a rate g_F. The income from entrepreneurship is risky and discounted at the rate $r_E > r_f$. The non-pecuniary component (N) incorporates an individual's subjective valuation of the benefits of being an entrepreneur. This captures any non-monetary utility the individual gains from being an entrepreneur, and their preference towards entrepreneurship. It could also have a negative value for individuals that have a very high preference for wage employment. As Hamilton (2000) suggests, non-pecuniary benefits are important in explaining

entrepreneurial choice. Combining the two components, the expected lifetime earnings from entrepreneurship E can be written as:

$$E = F + N \tag{2}$$

where:

$$F = \frac{D}{r_E - g_D} \tag{3}$$

Individuals who are more risk-averse will have a higher r_E thus reducing their valuation of future entrepreneurial income.

An initial investment I is required to start a firm. To be able to cover this investment, individuals must either have enough liquid wealth to cover the amount, or should have enough wealth such that they can borrow the difference between the investment required and their liquid wealth.

Their total wealth w_T consists of a liquid portion w_L and an illiquid portion w_I. The individual can pledge a fraction α of their total wealth and borrow an amount B not exceeding αw_I. For simplicity, I assume that the borrowed amount can be repaid in as many instalments as the entrepreneur wishes to and does not pay any interest. An individual with enough liquidity to cover the required initial investment, i.e. $w_L \geq I$ will choose to become an entrepreneur as long as the following condition is met:

$$F + N \geq L \tag{4}$$

Liquidity constraints may be binding for prospective entrepreneurs with good prospects holding them back from starting a venture (Evans and Jovanovic, 1989). In that case, they would need to take on debt. After the introduction of debt, it is not sufficient that their expectations of entrepreneurial earnings exceed their expectations of labour income. It is also important that they can generate enough cash flow to service the debt. In the case that the liquid wealth w_L is not adequate to cover the required investment I, the individual will borrow B to make the investment such that:

$$w_L + B = I \tag{5}$$

As long as the following conditions are met:

$$\alpha w_I \geq B \tag{6}$$

$$F + N \geq L \tag{7}$$

$$F \geq B \tag{8}$$

Equation (5) indicates that the entrepreneur can cover the required investment by combining the liquid wealth and the proceeds from borrowing. Equation (6) defines the upper limit for borrowing as a fraction of the entrepreneur's illiquid wealth. Equations (7) and (8) have important implications regarding the expected financial performance of the firm. Equation (7) implies that the entrepreneur will pursue entrepreneurship as long as the financial and non-pecuniary benefits of entrepreneurship match or exceed the expected labour income, which is the same as for entrepreneurs who are not liquidity constrained. However, since the entrepreneur is taking on debt, the financial proceeds from entrepreneurship must be adequate to cover the repayment of debt as defined in equation (8).

In the context of this paper, the oil price shock operates by lowering the individual's expectations of future labour income, i.e. L. For an individual who was employed in the oil and gas sector, the decline in oil prices meant that they could no longer expect to continue on the same growth trajectory of wages. This can be driven by either a contraction in the sector, or the unwillingness of a potential employer in a different sector would to pay for any sector-specific skills.

When L drops, individuals with lower values for $F + N$ will now find it lucrative to start firms. Their previous decision to remain in employment can thus be a result of a lower F, or a lower N. A lower F can either be because they expect to earn little from the firm (D), or because they are very risk averse, and use a higher discounting factor for entrepreneurial returns (r_e). The financial performance of the firm that the marginal entrepreneur starts will thus depend on whether their reason to remain in employment was financial prospects (low D), a strong preference for employment over entrepreneurship (low N) or high risk aversion (high r_e).

If the marginal entrepreneur did not start a firm previously because of low financial prospects (low D), we can expect the firm performance to get worse as more individuals become en-

trepreneurs. In a group of individuals with similar labour income and entrepreneurial ability, those with the highest value for non-pecuniary benefits will select into entrepreneurship in the absence of wealth constraints. For the same level of liquid wealth, as long as it is adequate to cover the initial investment required, lower N or higher r_e is likely to be the reason for remaining in employment. If these individuals with low value for non-pecuniary benefit or higher risk aversion are pushed into entrepreneurship, we can expect firms with better financial performance following an increase in the number of entrepreneurs.

The other expectations from this framework are also consistent with the empirical evidence in the literature. We can expect that individuals accumulate wealth over time. So, for individuals later in their career, the wealth constraints are relaxed and we can expect more entrepreneurship among individuals with high values for non-pecuniary benefits. For instance, when an individual gets a positive shock to their liquidity, i.e. an increase in w_L, they will start a firm as long as their total entrepreneurial earnings (which also includes non-pecuniary benefits) exceeds their expected earnings from employment. So, if the individual values non-pecuniary benefits, they will start a firm even if the financial benefits are low as seen in Andersen and Nielsen (2012). On the contrary, if the individual gets a positive shock to the portion of their total wealth that they can pledge (Schmalz et al., 2017) α, it increases the amount they can borrow αw_T. They can now borrow more (i.e. they can choose a higher B), but since they still need to make enough money to cover debt payments, non-pecuniary benefits alone cannot influence the decision, and the firms are likely to have higher returns than comparable entrepreneurs who are not liquidity constrained.

3 Data

I construct a data set of new firms from administrative data on the population of Norwegian limited liability companies and their owners over the 2010-2018 period obtained from the Norwegian Tax Authority. I then match this with registry data on employment, wealth, gender, and age which is maintained by Statistics Norway. This gives me a comprehensive record of the owners of new firms, their past employment, and various demographic attributes such as gender, age and location.

3.1 The oil price drop and the Norwegian oil and gas sector

There were 248,197 limited liability firms active in Norway in 2014. I identified the firms related to oil and gas using the firms' industry codes[1]. I include firms classified under 06 - Extraction of crude petroleum and natural gas, 09.1 - Support activities for petroleum and natural gas extraction, and 19.2 - Manufacture refined petroleum products in my classification of oil and gas related firms. In 2014, there are 277 firms with at least one employee, and 154 with more than 10 employees in oil and gas. Table B.1 shows the number of oil and gas firms active in each year during 2010-2017 with at least one individual on the payroll. Until 2014, the number of active firms is on the rise. Following the decline in oil prices, the number of active firms in the sector declined.

Looking at these trends in tandem with the number of individuals employed in oil and gas related firms (table B.2), the oil price drop had a pronounced effect on both small and large firms. I see a large drop in the number of small firms suggesting that they responded by completely downsizing, and possibly ceasing operations. The number of larger firms does not decrease as much suggesting that they responded by reducing the number of employees. Looking at the overall trend in the number of people employed within the oil and gas sector between 2010 and 2017 (figure A.4), the number steadily increases until 2014 reaching 68,166 individuals. Following the drop in oil price, the number drops below its 2011 levels. The sector employs 50,090 individuals in 2016. While the sector recovered slightly in 2017, it still employed about 12,000 fewer individuals than in 2014.

3.2 Entrepreneurship and oil employees

Following the oil price shock in 2014, the downsizing of the workforce in the oil and gas sector happened gradually during late-2014 and 2015. As information on new firms and employment are both reported annually, I use a two year window to identify whether a founder in a new firm had a background in the oil and gas sector. An individual is assumed to have a background in the oil and gas sector if they were employed in the sector two years prior to the founding of the firm, but are no longer reported to be working in the sector. For example, an individual who starts a firm in 2015 is considered to be an entrepreneur with

[1] I use the SN2007 classification which is the Norwegian standard based on European Union's NACE Rev.2 standard

a background in oil and gas if they were employed in the oil and gas sector in 2013, but are not working in oil and gas as of 2015.

Looking at the number of new firms and founders between 2011 and 2016 in Norway, the total number of new firms each year is relatively stable suggesting no sharp trends in new firm formation in general around the oil price shock. In contrast, there is a steeper increase in the number of new firms started by previous oil and gas employees following the drop in oil prices (figure A.6).

In 2015 and 2016, there is a pronounced increase in the number of entrepreneurs coming from a background in oil (Tables B.4 and B.3). The number of founders in new firms with a background in oil and gas in 2016 more than doubles between 2014 and 2016. This increase is observable in both small and large firms. Comparing the number of founders with an oil and gas background with the number of firms with these founders, I see that there are more firms than founders. This effect is the most prominent in larger firms suggesting that some of these individuals are owners in several large firms.

3.3 The new entrepreneurs

The change in number of firms and employees in the oil sector after 2014 suggest that the decline in oil prices caused a downsizing in the oil and gas sector. The disproportional increase in new firms with at least one owner with a background in oil and gas also suggests that the decline was followed by a slight increase in entrepreneurship among people previously employed in oil. In order to explore these entrepreneurs further, I first limit my sample to firms that have fewer than 10 owners to eliminate capturing minority shareholdings in large firms. This threshold is high enough to accommodate firms that are owned through, or have outside equity investments from individual and family-owned holding companies. Holding private equity through holding companies is common in Norwegian firms. This threshold represents about 95% of all new firms in Norway.

The oil price shock increased the level of entrepreneurship among individuals employed in the oil and gas sector in Norway. Figure A.9 shows that the proportion of individuals employed in the oil and gas sector that left their jobs to start a new firm in the next two years increased in 2014. While this ratio was around between 1.95% and 2% between 2010 and 2013, it climbed to 2.25% in 2014.

Based on their previous jobs, there has been no major shift in the composition of oil employees who transitioned to entrepreneurship after the oil price shock. I look at individuals who started new firms two years after leaving the oil and gas sector and match this with their employment records in the years prior to starting the firm. I use their occupational classification codes[2] reported by the employer to identify what their job was in the oil and gas firm. Table B.8 shows that the most common past occupations for entrepreneurs coming from the oil and gas sector are in the domain of engineering and management. Above 50% of entrepreneurs that started a firm in the years 2013-2016 were in an engineering position (classified as drilling operators, engineers or civil engineers) two years prior to starting the firm. This shows that future entrepreneurship is more common in these groups, and the overall composition did not see a drastic shift after the oil price drop.

I see some key differences in the pre-entrepreneurship earnings of individuals that went on to become entrepreneurs after leaving the oil and gas sector. Figure A.7 shows the median pre-entrepreneurship wage [3] among individuals who left the oil and gas sector to start a new firm in the given years. The to-be entrepreneurs earned between 900,000 and 1,000,000 NOK in wages, which is substantially higher than the median wage for the same occupational classification (at the 4-digit level) in Norway[4] which stood around 660,000 NOK.

As illustrated in table B.5, employees at the top of the income distribution in their firms are most likely to transition into entrepreneurship. This pattern also holds when looking at the salary distribution in the municipality of employment among oil employees (table B.6) as well as the wealth distribution of oil and gas employees within the municipality of employment (table B.7). This is consistent with the interpretation of entrepreneurship as a luxury good. Higher earnings may lead to entrepreneurship via the wealth channel or the skill channel. High earners are likely to accumulate more wealth over time easing the constraints to starting a new firm leading to more entrepreneurship. Alternatively, higher salary can be an indicator of higher ability suggesting that individuals with the highest

[2] In Norway, the STYRK08 classification system is a standard classification system used for occupations. It is based on ILO's international standard for occupational classification (International Standard Classification of Occupations - ISCO08)

[3] the wages are taken two years prior to when the firm was started, and are adjusted for CPI

[4] Obtained from Statistics Norway's website (https://www.ssb.no/en/statbank) for a matched group of professionals with the same 4-digit STYRK08 classification

skill in a certain firm or locality are more likely to start new firms.

There was a growth in entrepreneurship among oil and gas employees following the drop in oil prices. Oil and gas employees 2014 were about 30 pp more likely to start a firm in the next two years compared to 2013. This shift is disproportionately driven by oil employees at the middle of the income distribution at the firm level as well as the municipality level. Looking at the transition rates over the 2010-2014 period, transition to entrepreneurship was quite stable in the top quartile across the years, but increases by a larger magnitude in the lower quartiles 2014.

3.4 The new firms

To understand how these 'entrepreneurs of circumstance' are different, I look at firms that were founded by oil employees following the drop in oil prices in 2014. If an individual was employed in oil as of 2014 and was an owner in a new firm started in 2015 or 2016, the person is likely to be pushed into entrepreneurship as a result of the drop in oil prices. I thus include such individuals in my treatment group with an additional criteria that they are no longer reported to be working in oil and gas when the new firm was founded. For simplicity, I refer to these entrepreneurs as ex-oil founders.

Table B.9 reports the summary statistics for some key firm attributes for these firms of interest in the first two columns. I use accounting figures reported by the firms in their third year of operation (i.e. from 2017 for firms founded in 2015 and from 2018 for firms founded in 2016) in order to avoid the inaccuracy and noise often seen in reported numbers in the firms' early years. As in the previous section, the main firms of interest are those with 10 or fewer owners and they are reported in Panel A. Panel B includes firms with 10 or more owners. The firms in Panel B are quite large in terms of assets and have many owners by construction.

In 2015 and 2016, 46,724 new limited liability firms were incorporated in Norway with 10 or fewer owners. 675 firms among these had at least one owner who used to be employed in the oil and gas sector in 2014. Looking at the firms with and without ex-oil founders in Panel A, firms started by ex-oil founders are much smaller in size measured by total assets. The difference persists when looking at revenues, but the magnitude is much smaller. Comparing small firms with and without founders with a background in oil, some trends

are apparent. Firms with previous oil employees as owners also have higher profitability measured by Operating Return on Assets (OROA). These differences are all statistically significant. There are no significant differences in the age and wealth of founders between small firms in the two groups.

The median small firm has a single owner (which is also true for the universe of firms founded in these years), but the median small firm with an ex-oil founder as a founder has 2 owners. The median firm's paid-in capital also matches the minimum capital requirement for setting up a limited liability firm in Norway (30,000 NOK). The median firm founded by previous oil employees also exhibits slightly higher revenue growth, but the difference is not statistically significant.

4 Empirical model

The univariate results in section 3 suggest an increase in the level of entrepreneurship among oil and gas employees following the oil price shock. To identify the effect of the shock, I estimate the effect of the oil price shock on the likelihood of becoming an entrepreneur using a linear probability model. The objective here is to compare oil and gas employees from 2014 with oil and gas employees from the years before 2014 and see if the oil price shock made them more likely to become entrepreneurs in the future. I run the following regression:

$$\begin{aligned} Entrepreneur_{i,t+2} = \beta_0 Salary_{i,t} + \beta_1 Female_i + \beta_2 Wealth_{i,t} + \beta_3 2014Cohort \\ + \beta_4 2014Cohort \times Salary_{i,t} + FirmFE + JobLocationFE + \\ + JobTypeFE + ResidenceLocationFE + \eta_{i,t} \end{aligned} \quad (9)$$

The dependent variable $Entrepreneur_{i,t+2}$ is an indicator variable denoting whether an individual employed in the oil and gas sector i became an entrepreneur in year $t+2$. $Salary_{i,t}$ measures the salary of the individual i in year t. $Wealth_{i,t}$ measures the wealth of the individual i in year t. $Female$ is an indicator variable denoting the gender of the individual. The independent variable of interest $2014Cohort$ takes the value 1 if the individual was an oil employee in the year 2014, so β_3 measures the difference in the likelihood of entering

entrepreneurship between oil employees in the years prior to 2014, and in the year 2014. The coefficient interaction term $2014Cohort \times Salary_{i,t}$, β_4 measures whether the effect of salary on the likelihood of becoming an entrepreneur was higher or lower for the oil employees in 2014 compared to the previous years. According to my hypothesis, $\beta_3 > 0$ and $\beta_4 < 0$. The regression includes fixed effects for the firm that the individual is employed in, the municipality where the firm is located, the 4-digit code for the person's job, and the municipality in which the person resides.

In section 3, I also see that new firms with ex-oil founders were smaller in size and more profitable in the two cohorts of firms founded in 2015 and 2016. I am interested in identifying whether this effect is limited firms started by oil and gas employees following the oil price shock or is a general attribute of firms with founders having an oil and gas background. Additionally, I also want to make sure that the effects are not driven other economic trends following the oil price shock. I use a difference-in-differences (DD) analysis comparing firms on two dimensions: the presence of an ex-oil founder and whether the firm was set up after the oil price shock. I run the following model:

$$\begin{aligned} Outcome_{i,t+2} = {} & \beta_0 OilEmployee_{i,t-2} + \beta_1 OilEmployee_{i,t-2} \times ShockedCohort \\ & + \beta_2 log(AverageWealth_{t-2}) + \beta_x X_i \\ & + FoundingYearFE + IndustryFE + LocationFE + \eta_{i,t} \end{aligned} \quad (10)$$

For firms that were founded in year t, I use a broad set of firm level outcomes observed in year $t+2$ as the dependent variable $Outcome_{i,t+2}$ in various specifications for firm i. This includes firm assets, revenues, paid-in capital, operating return on assets (OROA), the ratio of operating income to total payroll, and two-year revenue growth. $OilEmployee_{i,t-2}$ is an indicator variable denoting whether firm i has at least one founder who used to work in the oil and gas sector in year $t-2$ but no longer worked in the in year t. $log(AverageWealth_{t-2})$ is the natural logarithm of the average wealth of all the owners in firm i in year $t-2$. As outlined in the framework in section 2, high-wealth individuals are more likely to start firms with lower financial prospects if they have a high value for non-pecuniary benefits. If so, high level of owner wealth would be associated with lower financial returns in the firm. Any differences in firm outcome that are driven by having an owner with a background in oil

and gas will be reflected in β_0, and any effects that are driven by oil employees pushed into entrepreneurship because of the oil price shock will be reflected in β_1. Under the null that there is nothing unique about an oil employee being pushed into starting a firm following the oil price shock, β_1 would be no different from zero.

The regressions include fixed effects for the year of founding of the firm, the industry (based on 5-digit NACE code) the firm operates in, and the municipality that the firm is located in. I show the results using interaction of these effects as well as individually. These fixed effects ensure that I only compare firms in the same industry that were started in the same year and are operating in the same municipality.

5 Empirical analysis

I divide the discussion of my results into four parts. First, I show that the oil price shock increased the likelihood of oil employees becoming entrepreneurs in the future, and disproportionately affected individuals who were not at the top of the income distribution. Second, I show that entrepreneurs with a background in the oil and gas sector start firms with lower assets. Third, I find that the entrepreneurs of circumstance who started firms after the oil price drop in 2014 run more profitable firms than entrepreneurs without a background in oil and gas who start firms in the same sector. Fourth, I show that these effects are not driven by faster growth in revenue.

5.1 Entry into entrepreneurship

I estimate the difference in new firm formation following the oil price shock in order to test the effect of a shock to job prospects on entry into entrepreneurship. This allows me to control for time-invariant traits and abilities of oil and gas employees that may influence their decision to start a new form. I run this portion of the analysis on individuals employed in the oil and gas sector in 2010-2014. As of 2014, 68,166 individuals are employed in the oil and gas sector and he average rate of entry into entrepreneurship in the entire sample of oil employees across the years 2010-2014 is 1.98% (table B.5).

I report the results of cross-sectional regressions of the likelihood of entry into entrepreneurship among oil and gas employees in table B.10. The dependent variable is an indicator

variable that takes the value 1 if the individual as a founder in a new firm within the next two years and was no longer employed in oil and gas when the firm was founded. The main variable of interest is also an indicator variable that takes the value 1 if the individual was employed in the oil and gas sector in 2014 and 0 otherwise. The regressions also include variables to capture differences in individual characteristics and various fixed effects.

The rate of entry into entrepreneurship rate was 0.4 percentage points higher for the 2014 cohort of oil and gas employees. In column (1), I include fixed effects for firm of employment and location of employment. This is to make sure that the observed increase is not driven by higher entrepreneurial activity among employees in a specific firm or location. In columns (2), I add fixed effects for job code capturing the kind of job the individual had in the oil and gas sector. This is because people in certain jobs might have a higher propensity to pursue entrepreneurship because of the kind of skills or prospects specific to those jobs. I see that the observed difference of 0.4 pp is same across all three specifications suggesting that the increased rate of entry was a sector-wide effect.

As suggested in the framework in section 2, individuals with higher wealth are less constrained and are more likely to become entrepreneurs. This is confirmed by the coefficient for wealth suggesting that an increase in wealth by 1 mNOK increases the entrepreneurship rate by 0.3 pp. This means that the oil price shock increased the likelihood of starting a firm by a magnitude comparable to an increase in wealth by 2 mNOK. This reaffirms the significance of the oil price shock in increasing new firm formation among oil and gas employees.

A higher salary can measure skill as well as the amount of wealth employees can accumulate. While it is not possible to disentangle the two components in the salary, higher pay would lead to higher entry into entrepreneurship via both channels. The regression coefficient is consistent with this expectation. An increase in salary by 1 mNOK increases the entrepreneurship rate by 0.7 percentage points for the entire sample. However, as observed in the coefficient for the interaction term, this effect is lowered by 0.3 percentage points for the 2014 cohort. This supports the hypothesis that entrepreneurship increases in groups with lower salaries following a decline in the sector, and broadly, the level of entrepreneurship increases following such a decline. This is also consistent with the prediction that the effect of labour market distress on future entrepreneurship is disproportionately higher for

lower income earners within the firm.

5.2 Effect on firm size and revenue

The increased level of entrepreneurship among oil and gas employees with lower wealth and income suggest that they might be more constrained than previous cohorts. This implies that they would be able to invest less in the firms. Some of the results in the univariate tests allude to this possibility. Firstly, firms started by previous oil and gas employees have more owners leading to a larger pool to draw from. Secondly, these firms have lower assets compared to firms without ex-oil employees as owners.

In table B.11, I run regressions of the firm's total assets after two years of founding for new firms set up in Norway in 2010-2016. The dependent variable is the logarithm of the firm's total assets in the third year operations. The variable of interest is the interaction term between an indicator variable for the cohort affected by the shock and an indicator variable that takes the value 1 if one of the founders of the firm is an ex-oil employee. The regressions include a control for the wealth of its founders. This is a crude measure for how constrained the founders of the firm are. In addition to that, I also include fixed effects for the industry the firm operates in, the year it was founded, and the municipality it operates in.

The coefficient for the wealth variable is positive, sizeable and statistically significant. This is consistent the expectation that wealthier owners are more likely to start larger firms. The coefficient for the ex-oil employee indicator is small and insignificant. This suggests that in general, firms started by oil and gas employees are not likely to be different from firms started individuals without an oil and gas background in the same industry and location. However, following the oil price shock, firms started by ex-oil employees are smaller than comparable firms started by individuals without an oil and gas background in the same year. A small firm started after the oil price shock with an owner who worked in oil and gas has approximately 31% less in assets than the comparable firm without an ex-oil employee as an owner based on the coefficient in column (4). As the effect is large when controlling for wealth, this implies that the lower assets may be driven by factors other than wealth constraints. One possible explanation is that the shocked cohort may have their wealth in illiquid assets limiting their ability to invest. Alternatively, it could also be because they

are more risk averse and want to limit share of their new firm in their total portfolio.

While I do not have a direct measure for risk aversion of individual owners, I can observe the level of debt in the firm. Results in table B.17 provide some support for the argument that they might be more risk averse. I run a regression of the firm's debt ratio [5] on an indicator for an ex-oil founder and its interaction with an indicator for the shocked cohort. I control for firm size and owner wealth. I observe that firms started by the treated cohort of oil and gas employees take on less debt in the firm. When I do not include a control for firm size, the coefficient is negative but not statistically significant. However, when I include a control for firm size (i.e. revenues), the effect is significant at the 10% level. The magnitude of the coefficient is also slightly larger when controlling for size. These findings allude to some differences in firm capital structure in the treated firms lending some support to the risk-aversion channel.

Despite of lower assets and lower debt, I observe that revenues of the firms started by the shocked employees do not suffer. In tables B.13 and B.12, I run the same regressions as in table B.11, but replace the firm's assets with revenues. I observe that there are no significant differences in revenues for firms stared by the shocked cohort of oil and gas employees. I observe no significant effect when I exclude a control for the firm's assets. Jointly with the results in table B.11, the firms generate revenues that are in line with comparable firms in the same industry and municipality despite of lower assets. This suggests that the wealth or liquidity constraints do not fully explain the lower asset base, and that the firms of interest may have better asset utilization bringing revenues in line with their counterparts.

5.3 Effect on performance

As suggested in the framework in section 2, the observed performance of the entrepreneurs of circumstance in this paper depends on why the marginal entrepreneur working in oil in 2014 had not started the firm prior to the shock. If their reason for remaining in employment was the lack of entrepreneurial ability (i.e. the expected cash flows they would receive from starting a firm), they would perform worse than comparable incumbents. Their decision could also be driven by a low valuation of non-pecuniary benefits or a high risk aversion leading to sharper discounting of entrepreneurial income than labour income. In

[5] Measured as the ratio of total debt to total assets, and winsorized at the 1st and 99th percentiles

these cases they would perform at least as well as the incumbents.

I evaluate the impact of having a founder who previously worked in oil and gas on the performance of the firm to see what the quality of the marginal entrant into entrepreneurship was following the drop in oil prices. I use the firm's operating return on assets (OROA)[6] to measure the firm's performance. I choose this measure as it is not affected by differences in the firms' capital structure. This is particularly important considering significant differences observed in the debt levels among firms in the treatment group.

In table B.14, I run regressions of the firm's OROA in its third year of operation. I include all the new limited liability firms set up in Norway in 2010-2016 and control for size and owner wealth. Inclusion of location, founding year and location fixed effects allows me to compare firms with a very high degree of similarity. I observe a negative and statistically significant coefficient on average wealth of owners. This is consistent with the expectation that individuals with low wealth constraints are more likely to start firms for the non-pecuniary benefits leading to lower performance when compared to counterparts who may have stronger financial incentives. I also see that firms with higher revenues are outperform firms with lower revenues.

I see that having a background in oil and gas does not have a meaningful impact on firm performance in the years prior to the oil price shock. The coefficient on the indicator variable for a having a background in oil and gas is not significant in any of the specifications. This coefficient captures the difference in performance between new firms started by oil and gas employees and new firms where the founders do not have a background in oil and gas across the study period. This rules out any ability based explanations of possible performance gaps for firms started by oil and gas employees. The picture is vastly different for the cohort of firms started by oil and gas employees following the drop in oil prices. The coefficient on the interaction term captures the difference in performance for the firms started by oil and gas employees following the drop in oil prices in addition to the effect of having a background in oil and gas. In the specification in column (4), I include three-way fixed effects for location, industry and founding year allowing me to capture the effect of having a founder with a background in oil and gas after the drop in oil prices on the firm's performance. I find that firms run by previous oil and gas employees generate 11.4 percentage points higher OROA

[6] I winsorize the OROA at the 1st and 99th percentiles

compared to firms in the same industry and municipality for the shocked cohort. This is a sizeable and significant difference.

An economically and statistically significant coefficient on the interaction term indicates that firms started by oil and gas employees following the oil price shock outperformed comparable firms that did not have a founder with an oil and gas background. The absence of any pre-trends confirms that the outperformance is not driven by higher entrepreneurial ability among oil and gas employees. As suggested in the framework presented in section 2, the shock to labour prospects can significantly increase the incentives for individuals with low valuation of entrepreneurial income driven by low preference for non-pecuniary benefits or higher risk aversion towards entrepreneurship. The performance gap in firms with ex-oil founders only in the shocked cohort lends additional support to this mechanism.

This suggests that there are employees who have good entrepreneurial skill who choose to remain in employment because they have a strong preference for wage employment. The source of this preference can be high risk aversion or low valuation of non-pecuniary benefits of entrepreneurship. These employees are disproportionately more common in the lower income quartiles within their firms. A labour market shock can thus push these employees to start firms which tend to perform better than entrepreneurs who are not affected by the shock.

5.4 How about growth?

I include an extensive set of fixed effects and controls to ensure that the difference in performance is not driven by any other events or macroeconomic trends following the oil price shock. The difference in performance persists after the inclusion of industry, founding year and location fixed effects. Commonly, entrepreneurship is associated with innovative firms characterized by fast revenue growth. This could be driven by the industry that the firms operate it and the regressions control for any industry specific trends. Alternatively, the effect could also be driven by firms that are slightly different within their 5-digit industry codes and fit the common view of 'innovative' entrepreneurship within their industries more than the firms started by founders without a background in oil and gas. To rule out the alternative explanation that there might have been other external factors independent of industry, founding year and location that pushed the firms of interest to grow faster than

their counterparts, I regress the two-year revenue growth of new firms incorporated in Norway in 2010-2016 on the same set of independent variables as in the other tests.
The firm's assets appear to be the only factor significant in the regressions reported in table B.18. It is expected that firms with higher assets can scale faster and achieve higher revenue growth than smaller firms. Apart from that, the variables of interest are not significant across any of the specifications. This indicates that the performance gap in the firms' third year is not because of faster revenue growth in the firms of interest, but more likely driven by a persistent performance gap. This rules out any external factors influencing firm growth, and at the same time suggests that ex-oil employees do not start high-growth firms, but simply more profitable firms.

6 Conclusion

Should employees working in a declining sector be encouraged to pursue entrepreneurship? There are several challenges in answering this question precisely, and I make an attempt to answer this by using the decline of one of the most prominent sectors in Norway: oil. The oil price shock increased the likelihood of an individual employed in the oil and gas sector to enter entrepreneurship. The findings of this paper suggest that those individuals started firms which had significantly higher returns than their counterparts in the same industry started in the same year. Looking at the background of these entrepreneurs, they seem more likely to come from the middle of the wage distribution in their firms of employment than the previous cohorts of oil and gas employees. However, the individuals that became entrepreneurs in the previous cohorts do not show such positive differences in performance. This paper highlights that there is a pool of potentially successful entrepreneurs in the middle of the income distribution within firms. Therefore, the marginal entrepreneur during normal times, typically from the top income distribution, may not accurately represent the marginal entrepreneur during an industry decline. As a result, policies aimed at individuals facing industry-wide decline should not be based solely on findings from normal times. The oil and gas sector in Norway serves as a useful case study to explore the potential of entrepreneurship as a viable option for individuals in sectors facing obsolescence.
In tandem, the results suggest that there are good potential entrepreneurs in wage employ-

ment, who, under the right circumstances, are able to start and run firms that are more profitable than industry peers. It also suggests that following a wide shock to a sector, individuals moving to a different sector and pursuing entrepreneurship actually do well. Creating incentives to ease this transition may have positive consequences for the wider economy.

A Appendix: Figures

Figure A.1
Oil price per barrel in USD between 2012 and 2017.

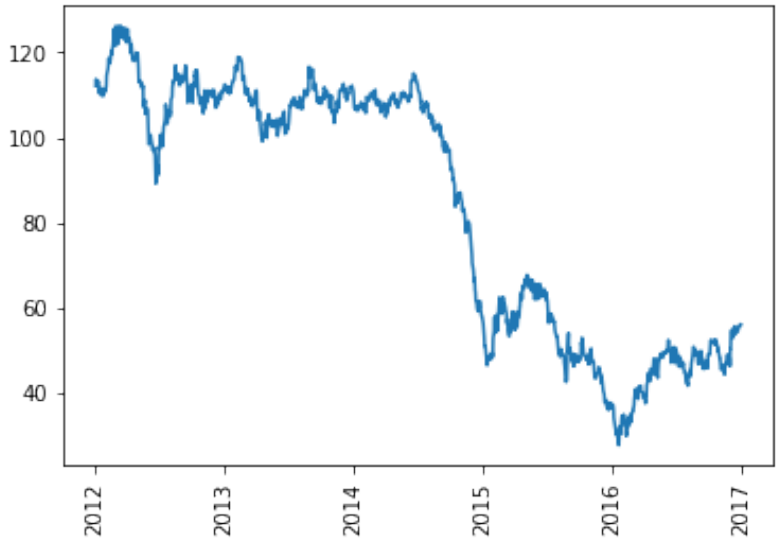


Figure A.2
Number of new firms incorporated by year during 2012-2016 in Norway. Small firms refer to firms with fewer than 10 owners.

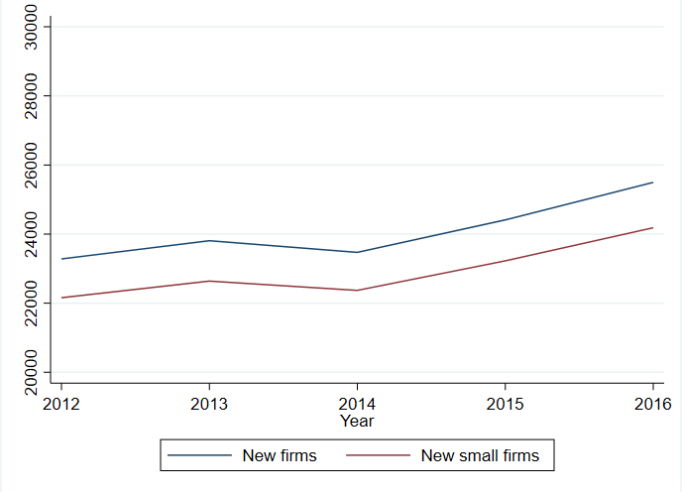


Figure A.3
Number of founders in new firms incorporated by year during 2012-2016 in Norway. Small firms refer to firms with fewer than 10 owners.

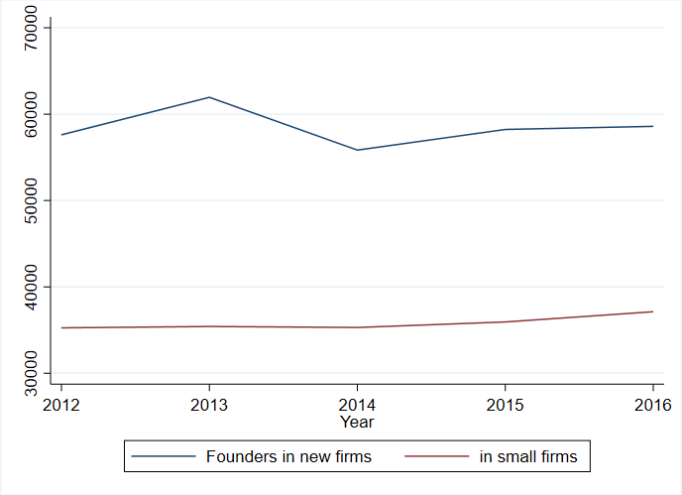


Figure A.4
Number of individuals employed in the oil and gas sector between 2010-2017

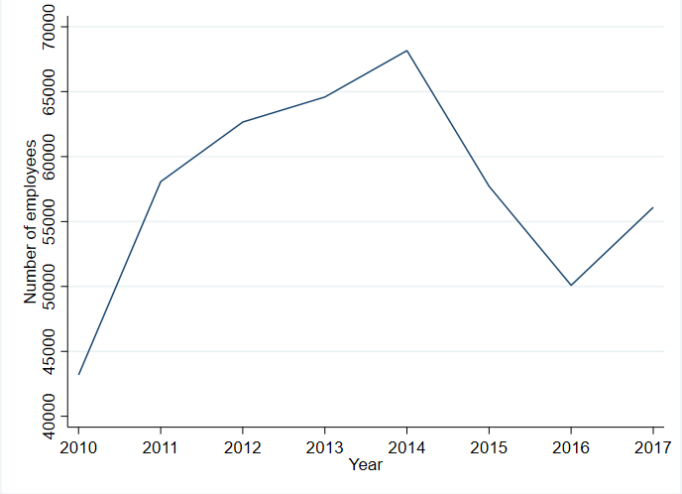


Figure A.5
Number of founders of new firms who were employed in the oil and gas sector 2 years prior to the founding of the firm but are no longer employed in the sector. Small firms refer to firms with fewer than 10 owners.

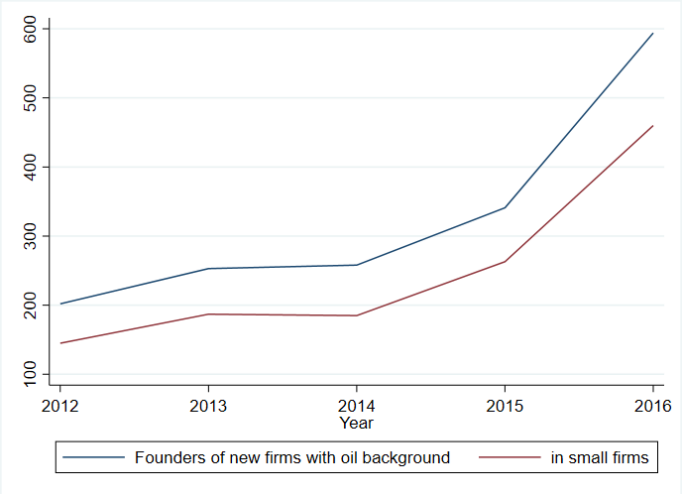


Figure A.6
Trend in the number of new firms set up in Norway between 2011 and 2016. To highlight the difference in trends clearly, I normalized the data for both groups by setting the value to 100 for 2011.

Figure A.7
The median wage for individuals who started a firm in the years 2012-2016 after leaving the oil and gas sector. The figure reports the annual salary for the last year of employment in the oil and gas sector. The pink lines show the 25th and 75th percentiles. The values are in '000NOK and are adjusted for inflation to 2015 levels.

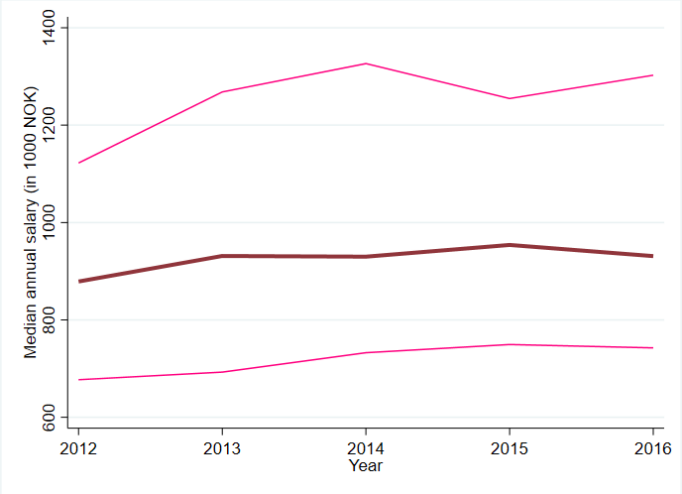


Figure A.8
Number of new firms incorporated by year during 2012-2016 in Norway with at least one founder who was employed in the oil and gas sector 2 years prior to the founding of the firm, but is no longer employed in the sector. Small firms refer to firms with fewer than 10 owners.

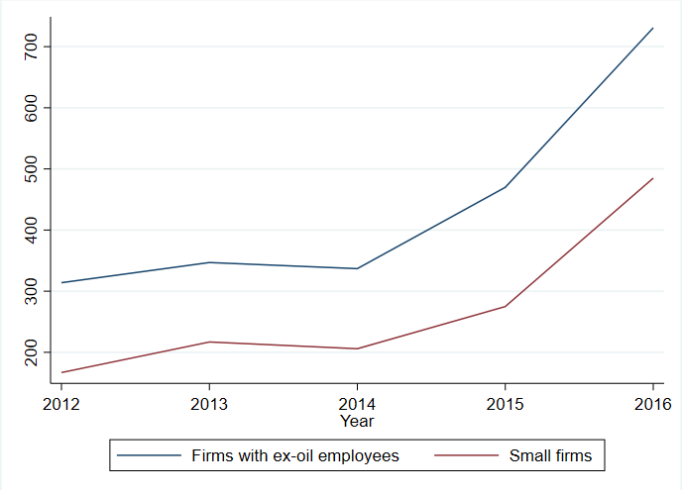
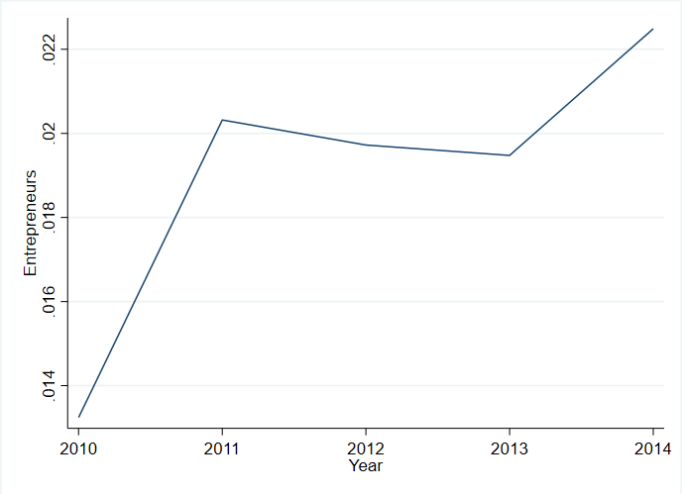


Figure A.9
Figure shows the proportion of oil and gas employees in a given year that left the sector to start a new firm within the next two years.



B Appendix: Tables

Table B.1
Table shows the total number of firms in oil and gas with at least one employee in the years 2010-2017. 'Small firms' refers to firms with 10 or fewer employees.

	Number of firms	
Year	**Total**	**Small firms**
2010	228	94
2011	248	101
2012	246	100
2013	257	107
2014	277	123
2015	254	97
2016	235	88
2017	266	111

Table B.2
The total number of employees working in the oil and gas sector in the years 2010-2017

	Number of employees	
Year	**Total**	**Small firms**
2010	43,190	265
2011	58,072	260
2012	62,667	290
2013	64,593	278
2014	68,166	304
2015	57,719	263
2016	50,090	268
2017	56,094	356

Table B.3
Table shows the number of founders in new firms set up during the years 2012-2016. The column 'Background in oil' indicates that the founder worked in a firm in the oil and gas sector 2 years prior to the founding of the firm, but is no longer employed in the sector. A threshold of 10 owners is chosen to classify small firms as this covers roughly 95% of all new firms in Norway. This is done to avoid capturing minor shareholdings in large enterprises.

	All founders of new firms		Subset of firms with <10 owners	
Year	All	Background in oil and gas	All	Background in oil and gas
2012	57,608	202	35,264	145
2013	61,953	253	35,424	187
2014	55,844	258	35,307	185
2015	58,231	341	35,948	263
2016	58,592	594	37,130	460

Table B.4
Table shows the number of new firms set up during the years 2012-2016. The column 'Background in oil' indicates that at least one of the founders worked in a firm in the oil and gas sector 2 years prior to the founding of the firm, but is no longer employed in the sector. A threshold of 10 owners is chosen to classify small firms as this covers roughly 95% of all new firms in Norway. This is done to avoid capturing minor shareholdings in large enterprises.

	All new firms		**Subset of firms with <10 owners**	
Year	**All new firms**	**Background in oil and gas**	**All**	**Background in oil and gas**
2012	23,282	314	22,159	167
2013	23,808	347	22,640	217
2014	23,472	337	22,372	206
2015	24,411	470	23,226	275
2016	25,498	731	24,185	485

Table B.5
The table shows the proportion of oil employees belonging to various salary quartiles within their firm of employment in the years 2010-2014.

	Year					
Salary quartile	**2010**	**2011**	**2012**	**2013**	**2014**	**Total**
1	1.42%	1.37%	1.34%	1.35%	1.59%	1.37%
2	1.76%	1.53%	1.59%	1.58%	1.86%	1.61%
3	1.78%	2.00%	1.81%	2.05%	2.35%	1.95%
4	2.98%	3.24%	3.16%	2.81%	3.22%	3.00%
Total	**1.98%**	**2.03%**	**1.97%**	**1.95%**	**2.25%**	**1.98%**

Table B.6
The table shows the proportion of oil employees belonging to various salary quartiles within their municipality of employment in the years 2010-2014.

	Year					
Salary quartile	2010	2011	2012	2013	2014	Total
1	1.55%	1.43%	1.50%	1.40%	1.72%	1.52%
2	1.70%	1.63%	1.53%	1.66%	1.93%	1.69%
3	1.89%	1.96%	1.72%	1.89%	2.13%	1.92%
4	2.79%	3.12%	3.14%	2.85%	3.23%	3.04%
Total	1.98%	2.03%	1.97%	1.95%	2.25%	2.04%

Table B.7
The table shows the proportion of oil employees belonging to various wealth quartiles within their municipality of employment in the years 2010-2014.

	Year					
Wealth quartile	2010	2011	2012	2013	2014	Total
1	1.55%	1.53%	1.55%	1.49%	1.68%	1.56%
2	1.63%	1.86%	1.63%	1.65%	2.03%	1.77%
3	1.79%	1.83%	1.68%	1.69%	2.12%	1.83%
4	2.95%	2.91%	3.03%	2.97%	3.18%	3.02%
Total	1.98%	2.03%	1.97%	1.95%	2.25%	2.04%

Table B.8
Table shows what percentage of entrepreneurs coming from the oil and gas sector were engaged in the professions listed. The list of professions is limited to the ten most common occupations for potential entrepreneurs each year.

Code	Occupation	2013	2014	2015	2016
P8113	Drilling operators	19.17%	19.70%	23.84%	22.39%
P311X	Engineers	19.42%	21.92%	20.81%	20.45%
P213X	Civil engineers	12.38%	14.53%	13.74%	11.96%
P13XX	Managers (product production and service)	13.59%	11.08%	10.51%	9.74%
P2114	Geologists and geophysicists	2.91%	2.22%		3.48%
P7411	Electricians		2.96%	1.82%	2.50%
P7215	Riggers and splicers		1.72%	2.02%	2.09%
P241X	Financial advisors (not accountants)				2.09%
P723X	Mechanics and repairmen			2.63%	1.95%
P1120	Administrative directors	2.43%	1.97%		1.53%
P12XX	Managers (admin, sales, research)	2.18%	2.71%	2.02%	
P351X	ICT technicians	1.94%	1.97%	1.82%	
P242X	Administrative advisors	2.18%		1.82%	
P7124	Construction workers (insulators)	2.91%			

Table B.9
Table shows the descriptive statistics for firms that were founded in either 2015 or 2016 in their third year of reporting. Panel A summarizes the characteristics of new firms founded with less than 10 owners in these years. Panel B summarizes the total number of new firms founded. The column 'Ex-oil founders' in both panels indicates the subset of firms that had at least one founder who was employed in the oil and gas sector in 2014, but was no longer employed in the sector when the firm was established. The 'Difference' column shows the difference in the variables between firms with and without an 'ex-oil founder' along with the t-statistic in a test for difference in means in the 't-stat' column. The numbers for revenue growth are represented as the ratio of the values in the third year of reporting and the values in the first year of reporting.

Panel A: Summary statistics, firms with fewer than 10 owners						
	Ex-oil founders		**No ex-oil founders**			
	Mean	**Median**	**Mean**	**Median**	**Difference**	**t-stat**
Total assets$_{t+2}$	2.89	0.51	8.92	0.70	6.03***	6.01
Operating revenues$_{t+2}$	2.26	0.29	3.31	0.35	1.05**	2.30
Paid-in capital$_{t+2}$	1.04	0.03	3.15	0.03	2.11**	2.44
Revenue growth$_{t_0,t_2}$	17.24	2.09	11.94	1.83	-5.31	-0.58
OROA$_{t+2}$	-0.11	0.00	-0.38	0.00	-0.27***	-3.19
Average owner wealth	19.97	1.84	11.94	1.57	-8.03	-0.76
Average founder age	44.35	43.00	43.21	43.00	-1.14	-1.45
Number of owners	2.23	2.00	1.92	1.00	-0.31***	-4.47
Number of firms	**675**		**46,724**			
Panel B: Summary statistics, all firms						
	Ex-oil founders		**No ex-oil founders**			
	Mean	**Median**	**Mean**	**Median**	**Difference**	**t-stat**
Total assets$_{t+2}$	40.45	1.01	35.23	0.75	-5.22	-0.47
Operating revenues$_{t+2}$	8.22	0.31	6.00	0.37	-2.22*	-1.87
Paid-in capital$_{t+2}$	16.77	0.06	10.24	0.03	-6.53**	-2.04
Revenue growth$_{t_0,t_2}$	17.92	2.08	12.63	1.81	-5.29	-0.77
OROAt$_{t+2}$	-0.20	0.00	-0.40	0.00	-0.20***	-2.61
Average owner wealth	43.82	3.77	14.11	1.67	-29.70***	-4.18
Average founder age	48.26	49.13	43.39	43.00	-4.87***	-9.35
Number of owners	74.46	3.00	3.39	1.00	-71.07***	-13.05
Number of firms	**1,095**		**46,724**			

Table B.10

This table reports the factors that influence entry into entrepreneurship among oil and gas employees based on the linear probability model outlined in section 4. Firm FE is a fixed effect for the firm where the individual is employed. Work municipality FE and Residence municipality FE are fixed effects for the municipality where the individual is employed and resides. Job code FE is a fixed effect for the 4-digit job classification of the individual's position in the oil and gas firm. The dependent variable is an indicator variable indicating if an individual becomes an entrepreneur in year $t+2$. t-statistics are in paranthesis. *, ** and *** denote significance at the 10%, 5% and 1% levels. I cluster standard errors by year and municipality of employment.

	Dependent variable: $Entrepreneur_{i,t+2}$		
	(1)	(2)	(3)
Salary	0.010***	0.007***	0.007***
	(8.90)	(6.64)	(6.49)
Female	-0.007***	-0.008***	-0.007***
	(-11.36)	(-14.06)	(-13.06)
Wealth	0.003***	0.003***	0.003***
	(11.95)	(12.12)	(12.08)
2014 Cohort	0.004**	0.004**	0.004**
	(2.00)	(2.48)	(2.49)
2014 Cohort x Salary	-0.003*	-0.003*	-0.003**
	(-1.76)	(-1.92)	(-1.97)
N	336,935	321,361	321,361
R^2	0.027	0.028	0.033
Firm FE	Yes	Yes	Yes
Work municipality FE	Yes	Yes	Yes
Job code FE	No	Yes	Yes
Residence municipality FE	No	No	Yes

Table B.11

This table reports the impact of having a founder who used to work in the oil and gas sector in around the oil price shock on the firm's total assets in year $t+2$. The dependent variable is the firm's total assets in year $t+2$. The regressions include new firms founded in the years 2010-2016. All regressions include a control for the average wealth of the firm's owners. Industry FE is a fixed effect for each industry based on the 5-digit NACE code. Founding year FE is a fixed effect for the year of founding. Location FE is a fixed effect for the municipality that the firm operates in. t-statistics are in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels. I cluster standard errors at the industry-founding year level.

	Dependent variable: $ln(Total\ Assets_{t+2})$			
	(1)	(2)	(3)	(4)
Shocked cohorts x Ex-oil employee indicator	-0.551***	-0.411***	-0.416***	-0.369**
	(-3.95)	(-2.91)	(-2.96)	(-2.08)
Ex-oil employee indicator	0.044	0.049	0.023	-0.007
	(0.49)	(0.57)	(0.27)	(-0.09)
$ln(Average\ owner\ wealth)$	0.447***	0.443***	0.444***	0.465***
	(26.56)	(25.82)	(25.33)	(23.12)
N	102,143	102,143	102,143	91,426
R^2	0.255	0.262	0.263	0.341
Industry FE	Yes	Yes	Yes	No
Founding year FE	No	Yes	Yes	No
Location FE	No	No	Yes	No
Industry x Founding year x Location FE	No	No	No	Yes

Table B.12
This table reports the impact of having a founder who used to work in the oil and gas sector in around the oil price shock on the firm's total revenue. The dependent variable is the firm's total revenue in year $t+2$. The regressions include new firms founded in the years 2010-2016. All regressions include a control for the average wealth of the firm's owners. Columns (2) and (4) also include a control for firm size. Industry FE is a fixed effect for each industry based on the 5-digit NACE code. Founding year FE is a fixed effect for the year of founding. Location FE is a fixed effect for the municipality that the firm operates in. t-statistics are in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels. I cluster standard errors at the industry-founding year level.

	Dependent variable: $ln(Revenues_{t+2})$			
	(1)	(2)	(3)	(4)
Shocked cohort x Ex-oil employee indicator	-0.232	0.030	-0.019	0.151
	(-1.51)	(0.29)	(-0.12)	(1.30)
Ex-oil employee indicator	0.062	-0.020	-0.000	-0.047
	(0.61)	(-0.28)	(-0.00)	(-0.60)
$ln(Average\ owner\ wealth)$	0.242***	-0.071***	0.240***	-0.066***
	(33.13)	(-12.35)	(27.53)	(-9.65)
$ln(Total\ Assets_{t+2})$		0.763***		0.735***
		(60.67)		(50.19)
N	76,317	75,849	66,076	65,607
R^2	0.211	0.563	0.334	0.612
Industry FE	Yes	No	Yes	No
Founding year FE	Yes	No	Yes	No
Location FE	Yes	No	Yes	No
Industry x Founding year x Location FE	No	Yes	No	Yes

Table B.13
This table reports the impact of having a founder who used to work in the oil and gas sector in around the oil price shock on the firm's total revenue. The dependent variable is the firm's total revenue in year $t+2$. The regressions include new firms founded in the years 2010-2016. All regressions include a control for the average wealth of the firm's owners. Industry FE is a fixed effect for each industry based on the 5-digit NACE code. Founding year FE is a fixed effect for the year of founding. Location FE is a fixed effect for the municipality that the firm operates in. t-statistics are in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels. I cluster standard errors at the industry-founding year level.

	Dependent variable: $ln(Revenues_{t+2})$			
	(1)	(2)	(3)	(4)
Shocked cohort x Ex-oil employee indicator	-0.006	0.014	0.030	0.151
	(-0.06)	(0.14)	(0.29)	(1.30)
Ex-oil employee indicator	-0.041	-0.040	-0.020	-0.047
	(-0.57)	(-0.56)	(-0.28)	(-0.60)
$ln(Average\ owner\ wealth)$	-0.067***	-0.067***	-0.071***	-0.066***
	(-11.41)	(-11.22)	(-12.35)	(-9.65)
$ln(Total\ Assets_{t+2})$	0.764***	0.763***	0.763***	0.735***
	(60.77)	(60.68)	(60.67)	(50.19)
N	75,849	75,849	75,849	65,607
R^2	0.561	0.561	0.563	0.612
Industry FE	Yes	Yes	Yes	No
Founding year FE	No	Yes	Yes	No
Location FE	No	No	Yes	No
Industry x Founding year x Location FE	No	No	No	Yes

Table B.14
This table reports the impact of having a founder who used to work in the oil and gas sector in around the oil price shock on the firm's OROA in year $t+2$. The dependent variable is the firm's total assets in year $t+2$. The regressions include new firms founded in the years 2010-2016. All regressions include a control for the average wealth of the firm's owners. Industry FE is a fixed effect for each industry based on the 5-digit NACE code. Founding year FE is a fixed effect for the year of founding. Location FE is a fixed effect for the municipality that the firm operates in. t-statistics are in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels. I cluster standard errors at the industry-founding year level.

	Dependent variable: $OROA_{t+2}$			
	(1)	(2)	(3)	(4)
Shocked cohort x Ex-oil employee indicator	0.068	0.097**	0.094**	0.113**
	(1.58)	(2.23)	(2.17)	(2.15)
Ex-oil employee indicator	0.034	0.027	0.029	0.039
	(1.09)	(0.87)	(0.94)	(1.28)
$ln(Average\ owner\ wealth)$	-0.013***	-0.013***	-0.011***	-0.010***
	(-4.56)	(-4.38)	(-4.05)	(-3.16)
$ln(Revenues_{t+2})$	0.104***	0.104***	0.105***	0.100***
	(26.97)	(26.94)	(26.99)	(22.33)
N	76,016	76,016	76,016	65,772
R^2	0.073	0.074	0.074	0.223
Industry FE	Yes	Yes	Yes	No
Founding year FE	No	Yes	Yes	No
Location FE	No	No	Yes	No
Industry x Founding year x Location FE	No	No	No	Yes

Table B.15
This table reports the impact of having a founder who used to work in the oil and gas sector in around the oil price shock on the firm's paid-in capital. The dependent variable is the firm's paid-in capital in year $t+2$. The regressions include new firms founded in the years 2010-2016. All regressions include a control for the average wealth of the firm's owners. Industry FE is a fixed effect for each industry based on the 5-digit NACE code. Founding year FE is a fixed effect for the year of founding. Location FE is a fixed effect for the municipality that the firm operates in. t-statistics are in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels. I cluster standard errors at the industry-founding year level.

	Dependent variable: $ln(Paid-in\ capital_{t+2})$			
	(1)	(2)	(3)	(4)
Shocked cohort x Ex-oil employee indicator	-0.255***	-0.167*	-0.179**	-0.146
	(-2.72)	(-1.93)	(-2.10)	(-1.51)
Ex-oil employee indicator	-0.019	0.028	-0.022	0.017
	(-0.26)	(0.41)	(-0.33)	(0.24)
$ln(Average\ owner\ wealth)$	0.375***	0.365***	0.366***	0.381***
	(22.66)	(21.40)	(21.32)	(19.06)
N	103,232	103,232	103,232	92,466
R^2	0.22	0.255	0.259	0.324
Industry FE	Yes	Yes	Yes	No
Founding year FE	No	Yes	Yes	No
Location FE	No	No	Yes	No
Industry x Founding year x Location FE	No	No	No	Yes

Table B.16
This table reports the impact of having a founder who used to work in the oil and gas sector in around the oil price shock on the firm's labour efficiency. The dependent variable is the ratio of the firm's operating income to the total payroll in year $t+2$. The regressions include new firms founded in the years 2010-2016. All regressions include controls for the average wealth of the firm's owners and firm size. Industry FE is a fixed effect for each industry based on the 5-digit NACE code. Founding year FE is a fixed effect for the year of founding. Location FE is a fixed effect for the municipality that the firm operates in. t-statistics are in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels. I cluster standard errors at the industry-founding year level.

	Dependent variable: $Operating\ income/Total\ payroll_{t+2}$			
	(1)	(2)	(3)	(4)
Shocked cohort x Ex-oil employee indicator	-1.637	-1.852	-1.869	-2.432
	(-0.96)	(-1.09)	(-1.10)	(-1.32)
Ex-oil employee indicator	-0.574	-0.503	-0.411	-0.157
	(-0.50)	(-0.43)	(-0.35)	(-0.13)
$ln(Average\ owner\ wealth)$	-0.04	-0.042	-0.038	-0.138**
	(-0.80)	(-0.83)	(-0.76)	(-2.26)
$ln(Revenues_{t+2})$	-0.461***	-0.462***	-0.464***	-0.512***
	(-7.38)	(-7.37)	(-7.38)	(-6.23)
N	52,525	52,525	52,525	43,351
R^2	0.036	0.036	0.037	0.207
Industry FE	Yes	Yes	Yes	No
Founding year FE	No	Yes	Yes	No
Location FE	No	No	Yes	No
Industry x Founding year x Location FE	No	No	No	Yes

Table B.17
This table reports the impact of having a founder who used to work in the oil and gas sector in around the oil price shock on the firm's leverage. The dependent variable is the the ratio of the firm's debt to its assets in year $t+2$. The regressions include new firms founded in the years 2010-2016. All regressions include controls for the average wealth of the firm's owners and firm size. Columns (2) and (3) also include a control for firm size ($Revenues$). Industry FE is a fixed effect for each industry based on the 5-digit NACE code. Founding year FE is a fixed effect for the year of founding. Location FE is a fixed effect for the municipality that the firm operates in. t-statistics are in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels. I cluster standard errors at the industry-founding year level.

	Dependent variable: $Debt\ ratio_{t+2}$			
	(1)	(2)	(3)	(4)
Shocked cohort x Ex-oil employee indicator	-0.125	-0.213**	-0.173	-0.195**
	(-1.27)	(-2.43)	(-1.62)	(-2.05)
Ex-oil employee indicator	-0.001	0.053	0.041	0.041
	(-0.01)	(0.73)	(0.63)	(0.58)
$ln(Average\ owner\ wealth)$	-0.037***	-0.015***	-0.042***	-0.025***
	(-7.44)	(-2.60)	(-8.03)	(-4.20)
$ln(Revenues_{t+2})$		-0.116***		-0.101***
		(-15.08)		(-11.73)
N	102,381	76,016	91,664	65,772
R^2	0.033	0.05	0.155	0.203
Industry FE	Yes	No	Yes	No
Founding year FE	Yes	No	Yes	No
Location FE	Yes	No	Yes	No
Industry x Founding year x Location FE	No	Yes	No	Yes

Table B.18
This table reports the impact of having a founder who used to work in the oil and gas sector in around the oil price shock on the firm's revenue growth. The dependent variable is the ratio of the firm's revenue in year $t+2$ to its revenue in year t. The regressions include new firms founded in the years 2010-2016. All regressions include controls for the average wealth of the firm's owners and firm size. Industry FE is a fixed effect for each industry based on the 5-digit NACE code. Founding year FE is a fixed effect for the year of founding. Location FE is a fixed effect for the municipality that the firm operates in. t-statistics are in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% levels. I cluster standard errors at the industry-founding year level.

	Dependent variable: $RevenueGrowth_{t_0,t_2}$			
	(1)	(2)	(3)	(4)
Shocked cohort x Ex-oil employee indicator	-0.928	-2.840	-2.584	1.887
	(-0.04)	(-0.11)	(-0.10)	(0.06)
Ex-oil employee indicator	9.832	9.903	9.448	13.320
	(0.46)	(0.46)	(0.44)	(0.51)
$ln(Average\ owner\ wealth)$	-0.005	-0.022	-0.098	-0.007
	(-0.01)	(-0.05)	(-0.23)	(-0.01)
$ln(Total\ Assets_{t+2})$	4.572***	4.666***	4.665***	4.983***
	(6.71)	(6.68)	(6.67)	(5.53)
N	65,739	65,739	65,739	55,960
R^2	0.009	0.009	0.009	0.114
Industry FE	Yes	Yes	Yes	No
Founding year FE	No	Yes	Yes	No
Location FE	No	No	Yes	No
Industry x Founding year x Location FE	No	No	No	Yes

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