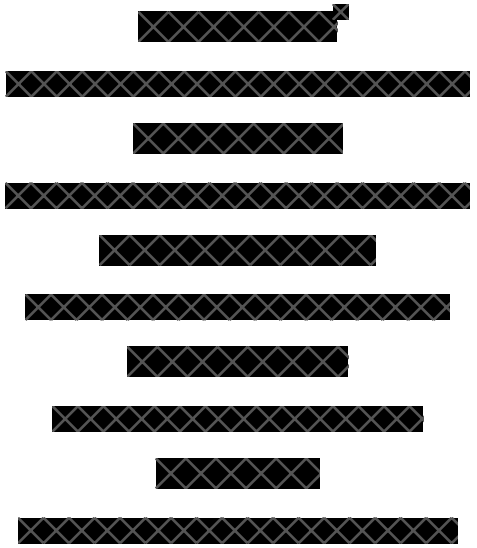
The Dark Side of Collateral: House Prices, Entrepreneurship, and Misallocation



Abstract

Industrialized countries have witnessed a significant decline in firm creation but the contributing factors remain unclear. We document and quantify the effect of barriers to entry into entrepreneurship from house price appreciations. Using Norwegian administrative data and cross-sectional variation in local house-price appreciation as shocks to collateral values, we show that i) house-price appreciations prevent entry of productive entrepreneurs (e.g., into high real-estate-intensity sectors), and ii) entrepreneurs owning real estate are more likely to have a higher average product of capital and labor (7% and 2%), and to invest less in fixed assets and R&D. This is a sign of real estate-driven misallocation that affects entry of productive entrepreneurs that do not own collateralizable real estate.

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1 Introduction

A large literature in both macroeconomics and finance investigates the real effects of financial shocks, and demonstrates that these shocks affect investment and employment decisions of firms. The financial accelerator literature argues that financial frictions amplify the negative effects of financial shocks (e.g., Kiyotaki and Moore (1997); Bernanke et al. (1999); Clementi and Hopenhayn (2006); Jermann and Quadrini (2012)). The same mechanism potentially operates in upturns: positive financial shocks (e.g., the reduction in long-term borrowing costs caused by quantitative easing) should relax financial frictions and stimulate investment and growth. However, the opposite is also possible. More favourable financial conditions could reduce productivity and growth if they channel too many resources to less productive firms that would otherwise not invest (or exit from the market) if financing was costlier.

In this paper, we study the potential misallocation effects of positive financial shocks in the relation between housing and entry into entrepreneurship. We use the rich Norwegian administrative data and cross-sectional variation in local house-price appreciation as shocks to collateral values for identification purposes. We identify the traditional positive effects of the *collateral channel* in Schmalz et al. (2017) or Chaney et al. (2012), but more importantly, we identify a *barriers to entry channel* that entrepreneurs face because of increases in house prices. Entrepreneurs who possess real estate are observed to exhibit a higher average product of capital and labor. They tend to allocate fewer resources towards investment in fixed assets and R&D, indicating a misallocation driven by real estate, which hampers the entry of productive entrepreneurs lacking collateralizable real estate. To the best of our knowledge, our study is the first to shed light on the costs associated with pledging collateral to access financing for entrepreneurship.

Firm dynamics have long been recognized in the literature as a key determinant of macroeconomic outcomes (Hopenhayn and Rogerson (1993); Melitz (2003); Klette and Kortum (2004)). Young and productive entrepreneurs that invest in innovative and high-growth projects account for a small fraction of the firm population, but significantly contribute to job creation (Decker et al. (2017); Decker et al. (2014); Haltiwanger et al. (2013)). Recent

research shows that ex-ante characteristics of entrepreneurs explain not only the output and employment dispersion, but also "up-or-out" dynamics (e.g., Sterk et al. (2021); Guzmán and Stern (2015); Bennett and Chatterji (2023)). However, these entrepreneurs often face capital constraints that prevent them from creating firms, or from choosing the optimal size for the firms they want to create. Indeed, capital constraints are the main factor determining entry into entrepreneurship (Schoar (2010)). A large literature documents a positive effect of house prices on entrepreneurship (on entry, on post-entry growth and on the probability of survival), because higher house prices increase the collateral available to the entrepreneur (Schmalz et al. (2017); Chaney et al. (2012)). However, higher real estate prices could distort entrepreneurial decisions in the two margins.

At the extensive margin, higher house prices may act as *barriers to entry* into entrepreneurship if new and productive entrepreneurs need to acquire real estate to produce, therefore, increasing misallocation. This hypothesis is consistent with Lanteri and Rampini (2023), who build an heterogeneous firms model of investment and capital reallocation subject to collateral constraints with new and old capital. Buyers of old capital tend to be more financially constrained than sellers, and thus, a higher price of old capital redistributes resources toward firms with a lower marginal product of capital (the sellers). As a result, house price appreciations i) relax collateral constraints, and increase firms' ability to borrow (*collateral channel*) and ii) redistribute resources towards firms with lower marginal product of capital (*distributive externality*), which reduces aggregate productivity.

At the intensive margin, higher house prices may *distort risky productive investment.* Even the entrepreneurial decisions of unconstrained entrepreneurs could be distorted by higher house prices if these entrepreneurs are encouraged to drop productive but risky innovative investment and devote more resources to real estate investments. Our goal in this paper is to identify the misallocation channels and estimate the potential misallocation effects.

We use a difference-in-differences strategy and administrative data from Norway to identify our barriers to entry channel. We compare the entrepreneurial outcomes of owners and non-owners of real estate within the same municipality, and then relate this difference to

the house-price dynamics observed across all the municipalities in Norway. The underlying assumption is that as house prices increase, owners experience an increase in the value of the collateral available to start a business. Non-owners within the same municipality serve as a useful benchmark because they face the same investment opportunities and demand shocks as owners. Thus, within-municipality comparison of entrepreneurial outcomes across owners and non-owners allows us to difference out local economic shocks that may drive both house prices and the creation of local businesses.

To provide evidence on our barriers to entry channel, we provide two sets of analyses. First, we select sectors according to the intensity of real estate (*barriers to entry#1*). High real estate sectors (HRE) are those in which we observe new entrepreneurs entering with relatively high amount of real estate in the firm balance sheet. The other sectors are classified as low real estate (LRE). The estimation of our two separate models suggests that high house prices prevent non-owners to enter especially in the HRE sectors, as we only find the positive and statistically significant association for our HRE sample. Second, we estimate the effect of house-price appreciations on entrepreneurial entry for owners and non-owners separately (*barriers to entry#2*). Our negative and statistically significant coefficient for non-owners suggests that house-price appreciation pose a barrier to entry into entrepreneurship for those productive entrepreneurs that do not own real estate.

Following the misallocation literature (Hsieh and Klenow (2009); Restuccia and Rogerson (2008)), we then evaluate the effects of house-price appreciations on the misallocation of resources. Our results suggests that entrepreneur owners, as compared to non-owners with similar characteristics, are associated with a 7% and 2% higher average product of capital and labor in the 5 years after entry. We observe the presence of real estate-driven misallocation of capital and labor across firms, as entrepreneur owners are operating with lower levels of capital and labor. Moreover, businesses in which the entrepreneur owned real estate at entry are associated with 2% and 0.3% lower capital expenditures and R&D. Our results are quantitatively more relevant for firms created within the real estate and construction sectors (e.g., unproductive sectors).

To strengthen our empirical strategy, we adopt an alternative approach to account

for local economic conditions. Specifically, we narrow our focus to tradable industries exclusively. Drawing from the work of Caggese et al. (2023), we classify firms according to the type of goods they manufacture, differentiating between tradable and non-tradable sectors. Notably, all our findings remain robust under this alternative empirical framework.

Our study adds to the existing literature on financing constraints and entrepreneurship, as well as on the impact of collateral values on economic activity. The works most closely related to ours are Schmalz et al. (2017) and Chaney et al. (2012). We extend the findings of these papers in two key ways. Firstly, while Schmalz et al. (2017) primarily focuses on the overall effect of house price shocks on entrepreneurship, we delve deeper by identifying both a collateral channel and a barriers-to-entry channel, as acknowledged by Lanteri and Rampini (2023). These channels interact to shape entry decisions, post-entry employment, investment, innovation, and firm survival.

Furthermore, we enhance the study in terms of identification and data quality. Unlike previous research relying on survey evidence, we utilize comprehensive data covering the entire Norwegian population. Our focus on transformational entrepreneurs, following the approach of Schoar (2010), ensures alignment with the typical entrepreneur, particularly regarding ownership stakes, and in terms of their response to economic conditions and policy decisions. Additionally, our capacity to control for a broader range of individual-level characteristics, including financial wealth, surpasses previous studies, thereby enhancing the external validity of our findings. This allows for more robust policy recommendations regarding entrepreneurship. Given the significant decline in firm creation witnessed in industrialized countries in recent decades, it is imperative to comprehend the underlying factors. Our identified barriers to entry channel could be a significant contributing factor to this decline.

Our paper also adds to the scant literature on the social costs or general costs of collateralization for (individuals and) firms. Donaldson et al. (2020) build a theoretical model in which when the costs of collateralization are considered, more collateral may imply underinvestment by firms. Biguri (2023) builds on Donaldson et al. (2020) and empirically shows that that collateralization costs have real effects on investment through firms' debt

structure choice. Our work is the first to study the costs associated with pledging collateral to access financing for entrepreneurship and to quantify the associated misallocation effects.

The rest of the paper is structured as follows. Section 2 outlines our data sources and presents evidence supporting the collateral channel in Norway. In Section 3, we detail the two empirical strategies and specifications employed to examine the barriers to entry channel, offering supporting evidence for this alternative pathway. Section 4 presents the analysis of the misallocation effects stemming from the barriers to entry channel, focusing on the allocation of capital and labor, as well as firms' innovation and investment decisions. Finally, Section 5 offers concluding remarks.

2 House-price Appreciations, Collateral Channel, and Entry into Entrepreneurship

2.1 Data

We include all individuals registered as residents in Norway from 2010 to 2016 in Statistics Norway (SSB). Data from the shareholder register is available since 2005, but the market value of the real estate of individuals is only available from 2010 on.

Building on Hvide and Moen (2010) and Schoar (2010), we define as entrepreneurs the individuals that register as owners of a limited liability firm in a given year when they hold at least a 50% ownership stake (e.g., transformational entrepreneurs).[1] We consider non-entrepreneurs the individuals that are registered as owners of limited liability firms in the previous 3 years before entry. Because we are interested in the transition into entrepreneurship, we drop individuals who are already self-employed (e.g., subsistence entrepreneurs) before entry at $t-1$. We also exclude individuals under 20 and over 64, and those individuals out of the labor force. This leaves us with 80,097 unique entrepreneurs with at least a 50% ownership stake from 2010 to 2016.

We merge this data set with two additional sources of information. First, we merge

[1] Schoar (2010) and Mondragon-Velez et al. (2010) define subsistence entrepreneurship as self-employment, characterized by low human capital and a strong motivation to support families, while transformational entrepreneurship is defined by business ownership, characterized by higher human capital and higher willingness to take risks. Both types of entrepreneurs respond very differently to economic cycles and to policy design.

firm-level data. All Norwegian limited liabilities firms must annually report audited balance sheet and income and loss statements to the Company Register, the Brønnysund Register. Norwegian law requires that accounts be audited, irrespective of company size which ensures high quality data even for small size or newly registered firms. Some firms-years have missing information on location, industry, and/or establishment year. Missing values are filled where possible, by checking consistency with industry and establishment years after the missing entry. Firms with negative assets and sales, and firms where the difference between reported total assets and liabilities exceeds 1 million kroner are excluded. We exclude firms whose organization number is missing from the sample.[2] Second, we merge information on local house prices for the 357 municipalities in Norway. For each year t and for each of these 357 municipalities, we calculate the cumulative growth of house prices between year $t-6$ and year $t-1$.

Table 1 presents summary statistics for this sample. Panel a) reports summary statistics for the cumulative house-price growth and the change in the unemployment rate in percentage points across municipalities. The median five-year municipality-level house-price growth in our sample period (2010 to 2016) is 33%. Crucial for our design, there is sufficient heterogeneity across municipalities: the standard deviation of five year house-price growth is 11%; at the 10th percentile, five-year house-price growth is 21%, whereas at the 90th percentile, it is as high as 49%. Figure 1 shows the average house price growth by region in Norway from 2004 to 2016.

Panel b) in Table 1, presents summary statistics on individual characteristics. The sample contains 16,900,000 observations, which correspond to approximately 2,5 million unique individuals between 2010 and 2016. 49% are homeowners and 2% are unemployed. The average individual is 42 years old, 47% are women, and 10% are foreigners. Finally, 60% have at least a secondary school diploma, whereas 39% have a Bachelor degree. Our outcome variable is a dummy variable which is equal to one if the individual registers as owner of a limited liability firm at $t+1$. The average probability that nonentrepreneurs transition into entrepreneurship is 0.26%.[3] Figure 2 shows the industry composition of

[2] We follow the same cleaning procedure for firm-level data as in Sorensen et al. (2011).

[3] Table A1 in the Appendix reports summary statistics for all the entrepreneurs in our sample, from 2010

newly registered limited liability firms for our sample period. The four most relevant industries are Construction, Wholesale & Retail, Administrative, and Real Estate. In fact, Construction & Real Estate account for 30% of the newly registered firms, sectors that tend to be considered as unproductive not contributing to long-term growth, employment, and innovation.

2.2 Empirical Strategy

Specification

We use the following empirical specification to test the collateral channel for Norway:

$$E_{i,j,t+1} = \alpha + \beta \text{Owner}_{i,t} X \Delta_j^{t-6 \longrightarrow t-1} + \theta \text{Owner}_{i,t} + \gamma Z_{i,t}$$

$$+ \tau Z_{i,t} X \Delta_j^{t-6 \longrightarrow t-1} + \delta_{j,t} + \epsilon_{i,j,t}, \tag{1}$$

where $E_{i,j,t+1}$ is a dummy variable equal to 1 if individual i living in municipality j in year t registers as owner of a new business with at least a 50% ownership stake at date $t+1$. $Owner_{i,t}$ is a dummy variable equal to 1 if individual i owns her house in year $t-1$, $\Delta p_{j,t-6 \longrightarrow t-1}$ is the cummulative house-price growth in municipality j between year $t-6$ and year $t-1$, and $Z_{i,t}$ is a vector containing the control variables (five education dummies, gender, age, foreigner dummy, past year wage/wealth and employment status, and industry of occupation). $\delta_{j,t}$ are municipality-by-year fixed effects.

Our identification strategy closely resembles that of Chaney et al. (2012) and Schmalz et al. (2017), utilizing a difference-in-differences approach. Specifically, we compare the entrepreneurial outcomes between owners and non-owners of real estate within the same municipality. We then correlate this discrepancy with the dynamics of house prices observed across our sample of 357 municipalities. The underlying premise of our identification strategy rests on the notion that when house prices increase, owners benefit from a rise in the value of collateral available for starting a business. Non-owners within the same

to 2016. Including individual characteristics, firms ownership characteristics, and the role of the entrepreurs within the firms they create.

municipality serve as a valuable control group because they encounter similar investment opportunities and demand shocks as owners. Consequently, by comparing entrepreneurial outcomes within municipalities among owners and non-owners, we can isolate and account for local economic shocks that potentially influence both house prices and the establishment of local businesses.

However, solely comparing owners and non-owners within the same municipality and incorporating controls for demand effects like the unemployment rate may not suffice for robust identification. Concerns arise that if the relationship between rising housing prices and entry into entrepreneurship were exclusively confined to non-tradable or construction sectors, the results could be influenced more by variations in local demand than changes in the collateral channel. To strengthen our empirical approach, we adopt an alternative method to account for local economic conditions by focusing solely on tradable industries. Inspired by Caggese et al. (2023), we classify firms based on the nature of their goods production, distinguishing between tradable and non-tradable sectors. To determine this classification, we utilize the World Input-Output Database (WIOD) to calculate the proportion of exports in the total value-added for each NACE 2-digit sector in Norway. Specifically, we categorize a sector as tradable ($\text{Tradables}_{i,j}$) if its export share exceeds the median threshold.

2.3 Baseline Results

Table 2 presents the ordinary least squares (OLS) estimation outcomes for equation (1). Standard errors are clustered at the municipality-by-ownership level. To ensure a comparison between owners and non-owners within the same municipality, thereby subject to identical local economic conditions, all regressions include municipality-by-year fixed effects. To assess the impact of observables on the estimation of β, we progressively introduce control variables and their interaction with house-price growth (Δ_p): five dummies for education (Column 2), past-year salary (or unemployment benefit if eligible) or financial wealth (FW) (Column 3), age (Column 4), gender, and nationality (Column 5), as well as current industry of occupation (Column 7). In Columns 6 and 8, we incorporate the interaction of the ownership dummy with changes in the unemployment rate from $t-6$ to $t-1$, measured at the municipality level. This additional control is significant as it

ensures that our effect is not solely influenced by owners responding differently to local investment opportunities or demand shocks, at least to the extent that the unemployment rate captures local economic activity shocks. The estimates of β in Table 2 demonstrate positive and statistically significant associations.

The point estimates exhibit instability across specifications. The point estimate of 0.166 undergoes significant change to approximately 0.041/0.299 when we introduce controls for previous wage/FW and employment status interacted with Δ_p (transitioning from Column 2 to Column 3). Wage/FW and employment status stand as primary determinants of ownership; concurrently, within our sample, individuals with higher wages are more inclined to initiate businesses in locales that have recently encountered a surge in house prices. Besides wage/FW and employment status, the inclusion of other control variables minimally impacts the estimated β. The limited influence of additional control variables on the estimated β is reassuring regarding the robustness of our findings. It suggests that our estimated effect is unlikely to be solely driven by self-selection into ownership based on unobservable factors.[4]

The effects we report in Table 2 are economically relevant. Going from the 25^{th} to the 75^{th} percentile of Δ_p represents a 14% increase. This leads to a 0.052/100*0.14 and 0.329/100*0.14 increase in the probability of starting a business (Column 8) for wage and financial wealth, respectively. Given that the unconditional probability of becoming an entrepreneur is 0.26% for the 50% ownership stake threshold, this represents a 2.8% (=0.0000728/0.0026) and a 17.72% (=0.0004606/0.0026) increase in the probability of becoming an entrepreneur when controlling for wage and financial wealth, respectively. Comparing our findings with those of Schmalz et al. (2017) while controlling for wage reveals notable distinctions. The authors document an 11% surge in the probability of entrepreneurship when progressing from the 25^{th} to the 75^{th} percentile of Δ_p. These differences primarily stem from the ownership stake requirements we impose on newly registered owners. While Schmalz et al. (2017) impose no restrictions on ownership stake, we draw from Hvide and Moen (2010) and Schoar (2010), defining entrepreneurs as individuals

[4]Table A2 in the Appendix presents estimates of the model, regressing the decision to initiate a company on a set of individual characteristics, excluding interaction terms with house price appreciations.

holding at least a 50% share in a newly established incorporated company. This criterion enables us to better capture the behavior of transformational entrepreneurs. total shares in a newly established incorporated company. This requirement allows us to capture better the behavior of transformational entrepreneurs.

Finally, Table A3 in the Appendix reports estimates of the model in Table 2 but for firms registered within Tradable industries, which allows us to control for local economic conditions better. As our point estimates suggest, the effect survives when we focus on firms that are not so sensitive to local economic conditions.

3 The Dark Side of Collateral: Barriers to Entry into Entrepreneurship

One limitation of the design in Schmalz et al. (2017) and in equation (1) is that we cannot really disentangle whether higher house prices help new entrepreneurs that are house owners or damage new entrepreneurs that are not house owners. To the extent that all specifications include department-by-year fixed effects to compare owners and non-owners within the same municipality, house price changes (Δ_p) are absorbed in equation (1). Therefore, only $Owner X \Delta_p$ can be identified, not Δ_p. The positive coefficient in Schmalz et al. (2017) and in our Table 2 can be interpreted as the positive effect of house prices increases on entry for owners (*collateral channel*), but the coefficient could also be driven by non-owners being damaged by house price increases (*barriers to entry channel*).

The collateral channel affects only house owners necessarily. But the house price effect on entrepreneurship might not be just the collateral effect. This point is analysed in some macro-finance models: when the price of assets goes up, it benefits the owners of these assets, but it damages productive agents that need that asset to produce. Lanteri and Rampini (2023) build a model of investment and capital reallocation subject to collateral constraints with new and old capital with heterogeneous firms. Buyers of old capital tend to be more financially constrained than sellers, and thus, a higher price of old capital redistributes resources toward firms with a lower marginal product of capital (the sellers). Building on Lanteri and Rampini (2023), house price appreciations i) relax collateral con-

straints, and increase firms' ability to borrow (*collateral hannel*), but also ii) redistribute resources towards firms with lower marginal product of capital (*distributive externality*), which reduces aggregate productivity. The distributive externality in Lanteri and Rampini (2023) is consistent with the barriers to entry channel we want to document.

In our case, a young entrepreneur without her own house might find it more costly to buy the structure she needs to produce. Or, she might need to buy a house for personal reasons, and so higher prices might divert resources from her entrepreneurial activities into household investment.

3.1 Empirical Strategy

To test the barriers to entry channel, we propose two alternative tests.

Specifications

We select sectors according to the intensity of real estate (*barriers to entry#1*). HRE are those in which we observe new entrepreneurs entering with relatively high amount of real estate in the firm balance sheet. The other sectors are classified as low real estate LRE. Then we estimate two separate models in which the dependent variable is the HRE dummy in the first model and LRE dummy in the second model, and the explanatory variables are the same as in equation (1).

The intuition behind this test is that if the collateral channel is the only one that matters, then we would find the positive association for both HRE and LRE sectors. However if the barriers to entry channel matters, then, the result should be stronger for HRE sectors: high house prices prevent non-owners to enter especially in the HRE sectors.

We estimate the following empirical specification:

$$E_{i,j,t+1} = \alpha + \beta \text{REI}_{i,t} X \Delta_j^{t-6 \longrightarrow t-1} + \theta \text{REI}_{i,t} + \gamma Z_{i,t}$$

$$+ \tau Z_{i,t} X \Delta_j^{t-6 \longrightarrow t-1} + \delta_{j,t} + \epsilon_{i,j,t}, \tag{2}$$

where $REI_{i,t} = \{\text{HRE}_{i,t}, \text{LRE}_{i,t}\}$. We use 2-digit NACE industry classification to compute

the average share of real estate holdings by sector for the whole population of firms each year (reh_{jt}). We define as $HRE(/LRE)$ those individuals creating firms with a share of real estate holdings above(/below) the median share of real estate holdings, reh_{jt}. We run equation (2) for HRE by dropping those new entrants creating firms below the median share of real estate distribution. We keep all nonentrants. Similarly, we run equation (2) for LRE by dropping those new entrants creating firms above the median share of real estate distribution. We keep all nonentrants.

To provide additional suggestive evidence on our barriers to entry channel, we propose a second test. We estimate separate regressions of Δ_p on entrepreneurial entry for owners and non-Owners (*barriers to entry#2*). As compared to equation (1), we include municipality *and* year fixed effects (vs. higher-order fixed effects), such that Δ_p survives. Only limitation of this approach is that we are no longer comparing owners and non-owners within the same municipality, and thus, we could be picking up demand effects. To address these concerns, we build on Galindo da Fonseca and Pannella (2022) and Adelino et al. (2015) and look at the effect for firms within the tradable sectors only, such that we can control for local economic conditions better.

We estimate the following specification:

$$E_{i,j,t+1} = \alpha + \delta\Delta_j^{t-6\longrightarrow t-1} + \beta\text{Type}_{i,t}X\Delta_j^{t-6\longrightarrow t-1} + \theta\text{Type}_{i,t} + \gamma Z_{i,t}$$

$$+\tau Z_{i,t}X\Delta_j^{t-6\longrightarrow t-1} + \delta_j + \delta_t + \epsilon_{i,j,t}, \tag{3}$$

where $Type_{i,t} = \{\text{Owner}_{i,t}, \text{Non-owner}_{i,t}\}$.

3.2 Main Results

Table 3 reports the OLS estimation results for equation (2). We cluster the standard errors at the municipality-by-ownership level. To guarantee the comparison of owners and non-owners within the same municipality, and thus, subject to the same local economic conditions, all our regressions include municipality-by-year fixed effects. Odd Columns report the results for the HRE entrepreneurs sample, while even Columns report those for

LRE. Columns 7 and 8 report the results for the most stringent specifications, including all the set of controls, interaction terms of controls with house-price appreciations, and controls for the unemployment rate including its interaction with the homeownership variable. The estimates of β for the HRE sample in Table 3 are positive and statistically significant, while the estimates for the LRE sample are negative but statistically non-significant.

The underlying intuition behind these findings is that if the collateral channel were the sole determinant, we would expect to observe positive estimated coefficients for both HRE and LRE samples. However, as our results indicate, the positive and statistically significant results are only evident for the HRE sample. This suggests that high house prices particularly impede non-owners from entering into entrepreneurship, especially in sectors characterized by high real estate activity. This outcome aligns with our barriers to entry channel, demonstrating that house price appreciations constrain entry into entrepreneurship for non-owners.

Table 4 reports the OLS estimation results for equation (3). We cluster the standard errors at the municipality-by-ownership level. As compared to the baseline specification, all our regressions include municipality *and* year fixed effects, to guarantee that we can derive point estimates of house-price appreciations for owners (Columns 1–3) and non-owners (Columns 4–6) of real estate. Our results in Columns 4–6 show that the estimates of δ for non-owners in Table 4 are negative and statistically significant.

The rationale behind these findings is precisely that house price appreciation acts as a barrier to entry into entrepreneurship for productive entrepreneurs who do not own real estate. Taken together, the results presented in Tables 3 and 4 offer compelling evidence in support of our barriers to entry channel. Regardless of the positive impact of financial shocks in alleviating financial constraints for real estate owners, productive entrepreneurs who lack real estate ownership encounter barriers to entry into entrepreneurship. In the subsequent section, we delve into the potential misallocation effects of these entry barriers on employment, innovation, and investment decisions.

4 Misallocation

To conceptualize the concept of misallocation, consider an economy consisting of heterogeneous firms characterized by varying levels of productivity A_i. These firms produce a homogeneous good according to the production function $y_i = A_i f(k_i, l_i)$, where f represents a strictly increasing and concave function in both capital k and labor l. As outlined by Restuccia and Rogerson (2008), in the absence of misallocating factors, there should exist a unique optimal allocation of labor and capital across firms to maximize total output.

Misallocation occurs when inputs fail to allocate efficiently across firms based on their productivity A_i, and differences in the average product of inputs serve as an empirical indicator of resource misallocation among producers (as highlighted by Hsieh and Klenow (2009)). Additionally, input misallocation can be attributed to underlying frictions that disproportionately affect certain entrepreneurs, such as borrowing constraints (as discussed by Hopenhayn and Rogerson (1993)). For instance, firms capital-constrained may operate with below-average levels of capital, resulting in a higher average product of capital empirically. Building on this rationale, our approach involves measuring the misallocation of productive inputs at the firm level, categorized by ownership status, and establishing a connection with observed input allocation (capital and labor), investment, and innovation decisions across firms led by real estate owners and non-owners.

4.1 Empirical Strategy

Specification

We begin by computing the average returns to capital and labor as follows:

$$larpk_{it} := ln(ARPK_{it}) = ln\left(\frac{Y_{it}}{k_{it}}\right)$$

and

$$larpl_{it} := ln(ARPL_{it}) = ln\left(\frac{Y_{it}}{l_{it}}\right),$$

where the Y_{it} is revenues, k_{it} is capital, and l_{it} refers to firm's labor. We also construct variables to measure the effect on investment and innovation decisions of these entrepreneurs:

$$capex_{i,t+k} = \frac{Capex_{i,t+k}}{Size_{i,t+k}}$$

and

$$r\&d_{i,t+k} = \frac{R\&D_{i,t+k}}{Size_{i,t+k}}.$$

Build on Hsieh and Klenow (2009) and Morazzoni and Sy (2022), we estimate the following empirical specification for firm i in year $t+k$:

$$y_{i,t+k} = \alpha + \beta Owner_{i,t} + \delta^{'}\Gamma_{i,t} + \psi^{'}\Omega_{i,t} + \alpha_{t,s} + v_{r(it)} + \epsilon_{i,t}, \tag{4}$$

where $y_{i,t+k} = \{larpk_{i,t+k}, larp_{i,t+k}, capex_{i,t+k}, r\&d_{i,t+k}\}$, $Owner_{i,t}$ is a dummy variable equal to 1 if the entrepreneur of the firm registered at t owns real estate at $t-1$, $\delta^{'}\Gamma_{i,t}$ and $\psi^{'}\Omega_{i,t}$ are a set of firm and individual controls capturing various factors apart from entrepreneur's real estate ownership that may affect the allocation of inputs of production across firms, and their investment and innovation decisions, and $\alpha_{s,t}$, and v_j are industry-by-year (2-digit), and municipality fixed effects, respectively.

4.2 Main Results

Table 5 reports point estimates for the cummulative effect from years 1–5 after entry into entrepreneurship of ownership (*Owner*) on the average returns to capital and labor (*larpk* and *larpk*), capital expenditures (*capex*), and innovation decisions ($r\&d$).[5] All regressions include industry-by-year (2-digit NACE) and municipality fixed effects. The even Columns report the point estimates for the most stringent specification for the four outcome variables of interest.

Focusing on Column 2, the results suggest that businesses in which the entrepreneur owned real estate at entry are associated with 7% higher larpk in the 5 years after entry relative to non-owner ones of similar characteristics. Following the misallocation literature

[5] Table A4 in the Appendix provides our estimation results for the annual effect instead of the cummulative effect in Table 5.

(Hsieh and Klenow (2009); Restuccia and Rogerson (2008)), we interpret such gap in the return on assets as a sign of misallocation of capital across firms. That is, we observe the presence of real estate-driven misallocation of capital across firms, and that entrepreneurs that are owners of real estate are operating with lower levels of capital compared to non-owners of real estate. Column 4, reports point estimates for the average return to labor. Our results suggest that businesses in which the entrepreneur owned real estate at entry are associated with 2% higher larpl in the 5 years after entry, which suggests the presence of real estate-driven misallocation of labor across firms, and that entrepreneurs that are owners of real estate are operating with lower levels of labor compared to non-owners of real estate. Columns 6 and 8 report point estimates for capital expenditures and investment in R&D. Businesses in which the entrepreneur owned real estate at entry are associated with 2% and 0.3% lower capital expenditures and R&D in the 5 years after entry.

We also re-do our misallocation analysis for the annual (Table A4 in the Appendix) and cummulative effects (Table 5) for tradable industries, annual (Table A5 in the Appendix) and cummulative (Table A6 in the Appendix) effects, to control for local economic conditions better. Our results are consistent to this improvement in terms of identification.

All in all, if we acknowledge that there are differences in the access to credit of owners and non-owners, we suggest that house-price appreciations could be responsible for the sub-optimal allocation of capital and labor across real estate owner and non-owner entrepreneurs. While misallocation alone is often regarded as an indicator of latent heterogeneities in financial constraints, our administrative data allows us to directly document a real estate-driven gap in entrepreneur outcomes, and hence to link that result to the observed real estate-driven capital and labor misallocation, in addition to the sub-optimal investment and innovation decisions.

Finally, we look at heterogeneous misallocation effects depending on the industries being considered. More specifically, we build on our Figure 2 results on the sectorial composition of newly created firms, and we estimate whether and how there are misallocation effects when we consider the Construction & Real Estate sectors. Table 6 reports the results. Regarding the Construction sector, firms created by owners of real estate within this sector

exhibit 8–10% higher misallocation of labor. Regarding the real estate sector, firms created by owners of real estate within this sector exhibit 20–26% higher misallocation of capital, and invest 1-3%. Our results suggest a crowd in for real estate-related sectors. This may generate a short-term impulse for demand, but it also implies that the threshold for entering other sectors (e.g., the productive ones) becomes higher.

5 Conclusions

Using variations in local house prices, this paper demonstrates that house price appreciations can serve as significant barriers to entry for new firms and can also impact the size of newly established firms. Our study uncovers a channel through which house prices can influence aggregate economic activity, distinct from those highlighted by Schmalz et al. (2017) or Mian and Sufi (2011). Specifically, our analysis reveals that rising house prices have a negative effect on the supply of entrepreneurs, potentially leading to a reduction in aggregate activity. We quantify the misallocation of capital and labor driven by real estate ownership, as well as the reduced investment in fixed assets and R&D. Further research is warranted in two key areas. Firstly, an exploration of the intensive margin is needed. Secondly, additional investigation is necessary to elucidate how other positive financial shocks impact firm entry, post-entry growth, and survival within the framework of financial frictions and the collateral channel.

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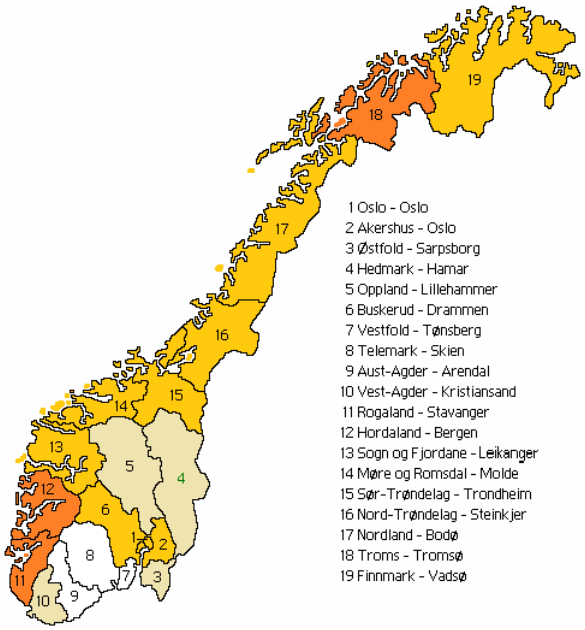

Figure 1: **Average House Price Growth by Region, Norway, 2004–2016.** *Orange:* above 8%. *Dark yellow:* 7%–8%. *Light yellow:* 6%–7%. *White:* below 6%. *Data Source:* Gathered by authors.

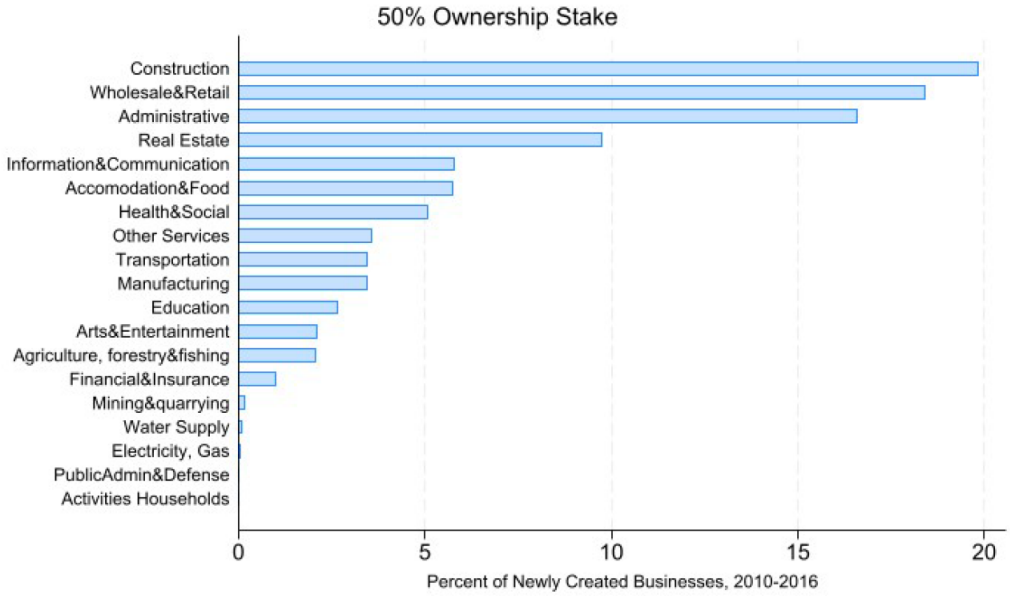

Figure 2: **Industry Composition of Newly Created Limited Liability Firms, Norway, 2010–2016.** *Data Source:* Statistics Norway (SSB).

Table 1: **Summary Statistics for Extensive Margin Analysis.** This table presents summary statistics for the sample that we use in the analysis of the effect of real estate capital gains on the decision to start a limited liability firm. The sample period is 2010 to 2016. Panel a) describes house-price growth (Δ_p) and the change in the unemployment rate (Δ_u) from year $t-6$ to year $t-1$ across all the Norwegian municipalities. Panel b) describes characteristics of individuals: a dummy equal to one if the individual registers as owner of a limited liability firm with at least a 50% ownership stake (*Entrepreneurship*), a dummy for homeownership (*Owner*), log of wages or financial wealth at $t-1$ ($Log(W/FW)$), a dummy for unemployed (*Unemployed*), age (*Age*), gender (1 for male, 0 for female) (*Gender*), a foreigner dummy (*Foreigner*), and education dummies (secondary school, high school, bachelor degree, master degree, or PhD) (*Education*). *Data Source:* Statistics Norway (SSB).

	Mean	SD	p10	p25	p50	p75	p90	N
				Panel a) House Price Growth				
Δ_p	0.35	0.11	0.21	0.27	0.33	0.41	0.49	2,499
Δ_u	0.01	0.90	-1.19	-0.54	0.07	0.63	1.15	2,499
				Panel b) Individual Characteristics				
Entrepreneurship	0.26	5.04	0.00	0.00	0.00	0.00	0.00	16,900,000
Owner	0.49	0.50	0.00	0.00	0.00	1.00	1.00	16,900,000
Log(Wage)	0.34	0.20	0.06	0.22	0.35	0.45	0.58	16,900,000
Log(Financial Wealth)	0.57	0.66	0.00	0.02	0.59	1.03	1.39	16,900,000
Unemployed	0.02	0.14	0.00	0.00	0.00	0.00	0.00	16,900,000
Age	41.52	12.14	25.00	31.00	42.00	51.00	58.00	16,900,000
Gender	0.53	0.50	0.00	0.00	1.00	1.00	1.00	16,900,000
Foreigner	0.10	0.30	0.00	0.00	0.00	0.00	1.00	16,900,000
Education								
Secondary School	0.17	0.38	0.00	0.00	0.00	0.00	1.00	16,300,000
High School	0.43	0.50	0.00	0.00	0.00	1.00	1.00	16,300,000
Bachelor	0.29	0.45	0.00	0.00	0.00	1.00	1.00	16,300,000
Master	0.10	0.30	0.00	0.00	0.00	0.00	0.00	16,300,000
PhD	0.01	0.10	0.00	0.00	0.00	0.00	0.00	16,300,000

Table 2: **House Price Appreciations, Real Estate Ownership, and Entry into Entrepreneurship.** This table reports estimates of a linear probability model regressing the decision to start a company on the interaction of local house-price appreciation in the five years prior to the decision (Δ_p), which is a dummy for individual real estate ownership (*Owner*). All regressions include municipality-by-year fixed effects. Column 1 includes no controls. Column 2 adds controls for education (five dummies). Column 3 adds controls for prior-year salary and previous year employment status. Column 4 adds controls for age. Column 5 adds controls for gender and nationality. Column 7 adds controls for current industry. Column 6 and 8 additionally control for the change in the unemployment rate in the municipality from year $t-6$ to year $t-1$, as well as its interaction with the ownership dummy. All columns include interaction terms of controls with Δ_p (excluding Column 1). Standard errors are reported in parentheses and are clustered at the municipality-by-ownership level. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively. *Data Source:* Statistics Norway (SSB).

	Entrepreneurship Dummy							
	1	2	3	4	5	6	7	8
				Wage				
Owner X Δ_p	0.166***	0.159***	0.041	0.057**	0.061**	0.068**	0.045	0.052
	(0.031)	(0.032)	(0.032)	(0.029)	(0.027)	(0.031)	(0.029)	(0.033)
Owner	0.043***	0.040***	-0.012	0.030***	0.030***	0.025**	0.036***	0.031***
	(0.011)	(0.010)	(0.010)	(0.009)	(0.009)	(0.010)	(0.010)	(0.011)
Owner X Δ_u						0.007*		0.007
						(0.004)		(0.004)
				Financial Wealth				
Owner X Δ_p	0.166***	0.159***	0.299***	0.379***	0.335***	0.344***	0.319***	0.329***
	(0.031)	(0.032)	(0.046)	(0.053)	(0.047)	(0.050)	(0.046)	(0.050)
Owner	0.043***	0.040***	-0.106***	-0.119***	-0.102***	-0.110***	-0.107***	-0.114***
	(0.011)	(0.010)	(0.019)	(0.024)	(0.021)	(0.023)	(0.020)	(0.022)
Owner X Δ_u						0.007*		0.006
						(0.004)		(0.004)
Controls	No	Educ	Wage/FW&Emp	Age	Gender&Nat	Gender&Nat	Industry	Industry
Controls*Δ_p	No	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Control Δ_u	No	No	No	No	No	**Yes**	No	**Yes**
Clust SE	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own
ZIP FE	No	No	No	No	No	No	No	No
Mun*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	16,570,846	16,124,786	16,123,902	16,123,902	16,123,902	14,209,520	15,732,070	13,860,347

Table 3: **Barriers to Entry#1: Real Estate Intensity upon Entry into Entrepreneurship.** This table reports estimates of a linear probability model regressing the decision to start a company on the interaction of local house-price appreciation in the five years prior to the decision (Δ_p), which is a dummy for individual real estate ownership (*Owner*). We provide estimates for two alternative samples: HRE vs. LRE. HRE (LRE) includes entrepreneurs registering as owners with a share of real estate holdings above (below) the median and non-entrepreneurs. All regressions include municipality-by-year fixed effects. All columns include interaction terms of controls with Δ_p. Standard errors are reported in parentheses and are clustered at the municipality-by-ownership level. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively. *Data Source:* Statistics Norway (SSB).

	Entrepreneurship Dummy							
	1	2	3	4	5	6	7	8
	HRE	LRE	HRE	LRE	HRE	LRE	HRE	LRE
				Wage				
Owner X Δ_p	0.041***	-0.026	0.036***	-0.016	0.041***	-0.020	0.036***	-0.015
	(0.012)	(0.022)	(0.013)	(0.024)	(0.012)	(0.022)	(0.013)	(0.024)
Owner	0.007	0.047***	0.010*	0.041***	0.003	0.039***	0.006	0.034***
	(0.005)	(0.008)	(0.005)	(0.009)	(0.005)	(0.008)	(0.005)	(0.009)
				Financial Wealth				
Owner X Δ_p	0.044***	-0.029	0.040***	-0.020	0.042***	-0.021	0.036**	-0.014
	(0.013)	(0.022)	(0.015)	(0.024)	(0.013)	(0.022)	(0.015)	(0.024)
Owner	0.004	0.050***	0.007	0.044***	0.002	0.040***	0.005	0.035***
	(0.005)	(0.008)	(0.006)	(0.009)	(0.005)	(0.008)	(0.006)	(0.008)
Controls	Gen&Nat	Gen&Nat	Gen&Nat	Gen&Nat	Industry	Industry	Industry	Industry
Controls*Δ_p	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Controls Δ_u	No	No	**Yes**	**Yes**	No	No	**Yes**	**Yes**
Cluster SE	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own
ZIP FE	No	No	No	No	No	No	No	No
Mun*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	13,738,185	13,748,852	12,100,025	12,109,775	13,414,342	13,424,562	11,812,392	11,821,731

Table 4: **Barriers to Entry#2: Separate Effect of House-price Appreciations for Owners and Non-owners upon Entry into Entrepreneurship.** This table reports estimates of a linear probability model regressing the decision to start a company and local house-price appreciation in the five years prior to the decision (Δ_p) for owners (*Owner*) and non-owners (*NonOwner*). All regressions include municipality and year fixed effects. All columns include interaction terms of controls with Δ_p (excluding Columns 1 and 4). Standard errors are reported in parentheses and are clustered at the municipality-by-ownership level. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively. *Data Source:* Statistics Norway (SSB).

	Entrepreneurship Dummy					
	1	2	3	4	5	6
			Wage			
Δ_p	-0.029	-0.183**	-0.306**	0.063	-0.190*	-0.327**
	(0.018)	(0.092)	(0.124)	(0.039)	(0.113)	(0.140)
OwnerX Δ_p	0.093***	-0.007	-0.021			
	(0.035)	(0.035)	(0.035)			
Owner	0.067***	0.050***	0.056***			
	(0.012)	(0.013)	(0.013)			
NonOwnerX Δ_p				-0.093***	0.007	0.021
				(0.035)	(0.035)	(0.035)
NonOwner				-0.067***	-0.050***	-0.056***
				(0.012)	(0.013)	(0.013)
			Financial Wealth			
Δ_p	-0.029	-0.185	-0.160	0.063	0.139	0.150
	(0.018)	(0.120)	(0.156)	(0.039)	(0.125)	(0.161)
OwnerX Δ_p	0.093***	0.324***	0.310***			
	(0.035)	(0.049)	(0.048)			
Owner	0.067***	-0.103***	-0.108***			
	(0.012)	(0.022)	(0.021)			
NonOwnerX Δ_p				-0.093***	-0.324***	-0.310***
				(0.035)	(0.049)	(0.048)
NonOwner				-0.067***	0.103***	0.108***
				(0.012)	(0.022)	(0.021)
Controls	No	Gender&Nat	Industry	No	Gender&Nat	Industry
Controls*Δ_p	No	**Yes**	**Yes**	No	**Yes**	**Yes**
Control Δ_u	No	**Yes**	**Yes**	No	**Yes**	**Yes**
Clust SE	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own
Mun FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	16,570,846	14,209,520	13,860,347	16,570,846	14,209,520	13,860,347

Table 5: **Misallocation at Entry, Cummulative Effect.** This table reports estimates for the cummulative effect from years 1–5 after entry into entrepreneurship of homeownership (*Owner*) on the average returns to capital and labor (*larpk* and *larpk*), capital expenditures (*capex*), and innovation decisions (*r&d*). All regressions include municipality fixed effects and industry-by-year fixed effects (2-digit NACE). Standard errors are reported in parentheses and are clustered at the municipality-by-ownership level. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively. *Data Source:* Statistics Norway (SSB).

	larpk		larpl		capex		r&d	
	1	2	3	4	5	6	7	8
				1 year after entry				
Owner	0.256	7.948***	2.942***	3.647***	-2.703***	-2.594***	-0.011***	-0.003**
	(1.566)	(1.599)	(0.784)	(0.782)	(0.224)	(0.208)	(0.002)	(0.001)
Obs	45,933	43,357	45,933	43,357	45,933	43,357	45,933	43.357
				2 years after entry				
Owner	0.469	7.889***	3.728***	4.534***	-2.384***	-2.344***	-0.009***	-0.002**
	(1.470)	(1.401)	(0.707)	(0.723)	(0.144)	(0.138)	(0.002)	(0.001)
Obs	77,629	73,449	77,629	73,449	77,629	73,449	77,629	73,449
				3 years after entry				
Owner	-0.348	6.977***	3.432***	4.159***	-2.396***	-2.311***	-0.009***	-0.002
	(1.521)	(1.437)	(0.646)	(0.655)	(0.116)	(0.120)	(0.002)	(0.001)
Obs	101,460	96,231	101,460	96,231	101,460	96,231	101,460	96,231
				4 years after entry				
Owner	-0.203	6.829***	3.172***	3.852***	-2.375***	-2.319***	-0.008***	-0.002**
	(1.525)	(1.462)	(0.638)	(0.646)	(0.108)	(0.110)	(0.002)	(0.001)
Obs	118,379	112,434	118,379	112,434	118,379	112,434	118,379	112,434
				5 years after entry				
Owner	-0.148	6.541***	3.428***	4.056***	-2.290***	-2.242***	-0.009***	-0.003***
	(1.526)	(1.471)	(0.649)	(0.654)	(0.108)	(0.116)	(0.002)	(0.001)
Obs	128.805	122.483	128,805	122,483	128,805	122,483	128,805	122,483
Clust SE	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own
Controls	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Mun FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit

Table 6: **Misallocation at Entry for Construction & Real Estate, Cummulative Effect.** This table reports estimates for the cummulative effect from years 1–5 after entry into entrepreneurship of homeownership for firms registered within Construction (*OwnerXConstruction*) and Real Estate (*OwnerXRealEstate*) industries on the average returns to capital and labor (*larpk* and *larpk*), capital expenditures (*capex*), and innovation decisions (*r&d*). All regressions include municipality fixed effects and industry-by-year fixed effects (2-digit NACE). Standard errors are reported in parentheses and are clustered at the municipality-by-ownership level. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively. *Data Source:* Statistics Norway (SSB).

	larpk	larpl	capex	r&d	larpk	larpl	capex	r&d
	1	2	3	4	5	6	7	8
				1 year after entry				
Owner X Construction	1.333	8.261*	0.174	0.000				
	(6.366)	(4.279)	(0.772)	(0.003)				
Owner X Real Estate					26.463***	-8.792***	-2.846**	0.002
					(9.605)	(2.950)	(1.129)	(0.003)
Obs	43,378	43,378	43,378	43,378	43,378	43,378	43,378	43,378
				2 years after entry				
Owner X Construction	2.004	8.513**	-0.352	-0.002				
	(5.730)	(3.798)	(0.551)	(0.003)				
Owner X Real Estate					22.136***	-10.719***	-2.054**	0.002
					(8.497)	(2.519)	(0.846)	(0.003)
Obs	73,503	73,503	73,503	73,503	73,503	73,503	73,503	73,503
				3 years after entry				
Owner X Construction	1.930	9.492**	-0.144	-0.000				
	(5.563)	(3.782)	(0.432)	(0.002)				
Owner X Real Estate					23.520***	-8.578***	-1.377**	0.004*
					(8.535)	(2.535)	(0.665)	(0.002)
Obs	96.245	96,245	96,245	96,245	96,245	96,245	96,245	96,245
Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Clust SE	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own
Mun FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit

Table 6, Con'ed **Misallocation at Entry for Construction & Real Estate, Cummulative Effect.**

	larpk	larpl	capex	r&d	larpk	larpl	capex	r&d
	1	2	3	4	5	6	7	8
				4 years after entry				
Owner X Construction	1.915	9.816***	-0.037	0.001				
	(5.546)	(3.660)	(0.381)	(0.002)				
Owner X Real Estate					22.138**	-7.835***	-1.139*	0.004*
					(8.640)	(2.545)	(0.581)	(0.002)
Obs	112,488	112,488	112,488	112,488	112,488	112,488	112,488	112,488
				5 years after entry				
Owner X Construction	1.854	9.719***	0.264	0.000				
	(5.700)	(3.712)	(0.357)	(0.003)				
Owner X Real Estate					20.233**	-7.613***	-0.962*	0.005*
					(8.774)	(2.549)	(0.557)	(0.003)
Obs	122,505	122,505	122,505	122,505	122,505	122,505	122,505	122,505
Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Clust SE	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own
Mun FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit

Table A1, Appendix. **Summary Statistics for Entrepreneurs with 50% Ownership Stake.** This table presents summary statistics for our Entrepreneurs registering as owners of a limited liability firm (Columns 1–3). The sample period is 2010 to 2016. We include the individual characteristics reported in Table 1, plus variables on firms ownership (e.g., number of firms owned and total direct ownership stake), and the role of the individuals within the firm (e.g., CEO, chair, professional chair, and board member). Columns 4–6 report the summary statistics of recurrent entrepreneurs that held at least a 10% ownership stake on previous firms. Columns 7–9 report the summary statistics of recurrent entrepreneurs that held at least a 50% ownership stake on previous firms. *Data Source:* Statistics Norway (SSB).

	All Entrepreneurs			Recurrent Entrepreneurs >=10% before			Recurrent Entrepreneurs >=50% before		
	Mean	SD	p50	Mean	SD	p50	Mean	SD	p50
	1	2	3	4	5	6	7	8	9
Owner	0.59	0.49	1.00	0.67	0.47	1.00	0.64	0.48	1.00
Log(Wage)	0.49	0.29	0.44	0.59	0.30	0.54	0.56	0.31	0.50
Log(Financial Wealth)	1.01	0.75	1.07	1.27	0.78	1.32	1.20	0.82	1.24
Unemployed	0.03	0.16	0.00	0.01	0.12	0.00	0.01	0.12	0.00
Gender	0.74	0.44	1.00	0.81	0.39	1.00	0.79	0.40	1.00
Age	41.41	11.37	40.00	42.06	10.77	41.00	42.42	10.57	42.00
Foreigner	0.11	0.31	0.00	0.04	0.20	0.00	0.05	0.23	0.00
Education									
Secondary School	0.16	0.37	0.00	0.11	0.31	0.00	0.15	0.36	0.00
High School	0.44	0.50	0.00	0.42	0.49	0.00	0.45	0.50	0.00
Bachelor	0.25	0.44	0.00	0.30	0.46	0.00	0.27	0.44	0.00
Master	0.13	0.34	0.00	0.16	0.37	0.00	0.12	0.32	0.00
PhD	0.01	0.11	0.00	0.01	0.10	0.00	0.01	0.09	0.00
Firm Ownership									
Firms Owned, Total	1.38	2.01	1.00	3.12	4.49	2.00	2.93	2.63	2.00
Firms Owned, 10%	1.30	1.59	1.00	2.85	3.55	2.00	2.78	2.13	2.00
Firms Owned, 50%	1.03	0.22	1.00	1.17	0.52	1.00	2.24	0.76	2.00
Max Direct	0.79	0.24	1.00	0.83	0.23	1.00	0.83	0.23	1.00
Role within Firm									
CEO	0.71	0.45	1.00	0.64	0.48	1.00	0.65	0.48	1.00
Chair	0.86	0.35	1.00	0.90	0.30	1.00	0.90	0.30	1.00
Prof Chair	0.03	0.16	0.00	0.02	0.13	0.00	0.02	0.13	0.00
Board	0.26	0.44	0.00	0.24	0.43	0.00	0.29	0.45	0.00
N	80,097			13,138			1,836		
Share Recurrent				16.4%			2.3%		

Table A2, Appendix. **Entry into Entrepreneurship.** This table reports estimates of a linear probability model regressing the decision to start a company on a set of individual characteristics. All regressions include municipality-by-year fixed effects. Column 1 includes real estate ownership. Column 2 adds controls for education (five dummies). Column 3 adds controls for prior-year salary and previous year employment status. Column 4 adds controls for age. Column 5 adds controls for gender and nationality. Column 6 adds controls for current industry. Standard errors are reported in parentheses and are clustered at the municipality-by-ownership level. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively. *Data Source:* Statistics Norway (SSB).

	Entrepreneurship Dummy					
	1	2	3	4	5	6
Owner	0.098***	0.092***	0.000	0.048***	0.049***	0.050***
	(0.002)	(0.002)	(0.004)	(0.003)	(0.003)	(0.003)
High school		0.043***	0.005	0.006	0.012***	0.012**
		(0.005)	(0.004)	(0.004)	(0.004)	(0.005)
Bachelor		0.024***	-0.032***	-0.044***	-0.005	0.019***
		(0.005)	(0.004)	(0.005)	(0.004)	(0.004)
Master		0.114***	0.007	-0.016***	0.011**	0.040***
		(0.007)	(0.005)	(0.006)	(0.006)	(0.006)
PhD		0.081***	-0.078***	-0.074***	-0.056***	-0.026*
		(0.014)	(0.014)	(0.015)	(0.014)	(0.014)
Log(Wage)			0.737***	0.890***	0.751***	0.677***
			(0.020)	(0.022)	(0.016)	(0.015)
Employed			0.061***	0.096***	0.061***	-0.050***
			(0.007)	(0.008)	(0.006)	(0.008)
Age				-0.009***	-0.008***	-0.007***
				(0.001)	(0.001)	(0.000)
Gender					0.163***	0.147***
					(0.009)	(0.010)
Foreigner					0.018**	0.007
					(0.007)	(0.008)
Controls	Own RE	Educ	Wage&Emp	Age	Gender&Nat	Industry
Clust SE	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own
Controls*Δ_p	No	No	No	No	No	No
Mun*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	16,590,197	16,143,809	16,142,924	16,142,924	16,142,924	15,750,705

Table A3, Appendix. **House Price Appreciations, Real Estate Ownership, and Entry into Entrepreneurship. Tradable Industries.** This table reports estimates of a linear probability model regressing the decision to start a company on the interaction of local house-price appreciation in the five years prior to the decision (Δ_p), which is a dummy for individual ownership (*Owner*) for Tradable industries only. All regressions include municipality-by-year fixed effects. Column 1 includes no controls. Column 2 adds controls for education (five dummies). Column 3 adds controls for prior-year salary and previous year employment status. Column 4 adds controls for age. Column 5 adds controls for gender and nationality. Column 7 adds controls for current industry. Column 6 and 8 additionally control for the change in the unemployment rate in the municipality from year $t-6$ to year $t-1$, as well as its interaction with the ownership dummy. All columns include interaction terms of controls with Δ_p (excluding Column 1). Standard errors are reported in parentheses and are clustered at the municipality-by-ownership level. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively. *Data Source:* Statistics Norway (SSB).

	Entrepreneurship Dummy							
	1	2	3	4	5	6	7	8
				Wage				
Owner X Δ_p	0.030**	0.024*	-0.016	-0.012	-0.011	-0.006	-0.013	-0.008
	(0.013)	(0.013)	(0.014)	(0.013)	(0.012)	(0.013)	(0.011)	(0.013)
Owner	0.013***	0.011***	0.005	0.009**	0.008**	0.006	0.009**	0.007*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Owner X Δ_u						-0.001		-0.000
						(0.001)		(0.001)
				Financial Wealth				
Owner X Δ_p	0.030**	0.024*	0.045***	0.049***	0.039***	0.042***	0.032**	0.035**
	(0.013)	(0.013)	(0.015)	(0.015)	(0.015)	(0.016)	(0.014)	(0.015)
Owner	0.013***	0.011***	-0.012**	-0.012**	-0.009	-0.010*	-0.008	-0.009
	(0.004)	(0.004)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)
Owner X Δ_u						-0.000		0.000
						(0.001)		(0.001)
Controls	No	Educ	Wage/FW&Emp	Age	Gender&Nat	Gender&Nat	Industry	Industry
Controls*Δ_p	No	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Control Δ_u	No	No	No	No	No	**Yes**	No	**Yes**
Clust SE	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own
ZIP FE	No	No	No	No	No	No	No	No
Mun*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	16,526,917	16,082,443	16,081,564	16,081,564	16,081,564	14,172,081	15,691,649	13,824,606

Table A4, Appendix. **Misallocation at Entry, Annual Effect.** This table reports estimates for the annual effect from years 1–5 after entry into entrepreneurship of owners (*Owner*) on the average returns to capital and labor (*larpk* and *larpk*), capital expenditures (*capex*), and innovation decisions (*r&d*). All regressions include municipality fixed effects and industry-by-year fixed effects (2-digit NACE). Standard errors are reported in parentheses and are clustered at the municipality-by-ownership level. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively. *Data Source:* Statistics Norway (SSB).

	larpk		larpl		capex		r&d	
	1	2	3	4	5	6	7	8
				1 year after entry				
Owner	0.256	7.948***	2.942***	3.647***	-2.703***	-2.594***	-0.011***	-0.003**
	(1.566)	(1.599)	(0.784)	(0.782)	(0.224)	(0.208)	(0.002)	(0.001)
Obs	45,933	43,357	45,933	43,357	45,933	43,357	45,933	43,357
				2 years after entry				
Owner	0.020	7.258***	3.814***	4.796***	-0.947***	-1.031***	-0.007***	-0.000
	(1.972)	(1.835)	(0.988)	(1.028)	(0.261)	(0.257)	(0.002)	(0.002)
Obs	31,696	30,092	31,696	30,092	31,696	30,092	31,696	30,092
				3 years after entry				
Owner	-2.232	5.044**	2.635**	3.229***	-1.236***	-0.992***	-0.006**	0.001
	(2.320)	(2.296)	(1.057)	(1.073)	(0.294)	(0.315)	(0.003)	(0.002)
Obs	23,831	22,782	23,831	22,782	23,831	22,782	23,831	22,782
				4 years after entry				
Owner	1.252	7.701**	1.582	2.080	-0.494	-0.625*	-0.007*	-0.007**
	(2.939)	(3.004)	(1.432)	(1.449)	(0.395)	(0.375)	(0.004)	(0.003)
Obs	16,919	16,203	16,919	16,203	16,919	16,203	16,919	16,203
				5 years after entry				
Owner	-0.811	5.082	7.739***	7.908***	0.578	0.564	-0.013*	-0.009*
	(3.919)	(4.127)	(1.982)	(1.969)	(0.421)	(0.398)	(0.007)	(0.005)
Obs	10,426	10,049	10,426	10,049	10,426	10,049	10,426	10,049
Clust SE	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own
Controls	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Mun FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit

Table A5, Appendix. **Misallocation at Entry, Annual Effect. Tradable Industries.** This table reports estimates for the annual effect from years 1–5 after entry into entrepreneurship of owners (*Owner*) on the average returns to capital and labor (*larpk* and *larpk*), capital expenditures (*capex*), and innovation decisions (*r&d*) for Tradable industries only. All regressions include municipality fixed effects and industry-by-year fixed effects (2-digit NACE). Standard errors are reported in parentheses and are clustered at the municipality-by-ownership level. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively. *Data Source:* Statistics Norway (SSB).

	larpk		larpl		capex		r&d	
	1	2	3	4	5	6	7	8
				1 year after entry				
Owner	5.296	12.451***	6.549***	6.708***	-2.724***	-2.440***	-0.013**	0.002
	(3.935)	(3.913)	(1.788)	(1.771)	(0.546)	(0.523)	(0.006)	(0.004)
Obs	9,732	9,301	9,732	9,301	9,732	9,301	9,732	9,301
				2 years after entry				
Owner	10.959**	19.453***	-1.763	-1.312	-1.328**	-1.584**	-0.010	-0.011**
	(4.738)	(4.268)	(2.869)	(2.891)	(0.663)	(0.678)	(0.006)	(0.005)
Obs	6,903	6,633	6,903	6,633	6,903	6,633	6,903	6,633
				3 years after entry				
Owner	5.973	11.647**	3.498	3.244	-0.141	0.253	-0.031***	-0.018***
	(6.027)	(5.812)	(3.442)	(3.370)	(0.706)	(0.727)	(0.009)	(0.005)
Obs	5,306	5,142	5,306	5,142	5,306	5,142	5,306	5,142
				4 years after entry				
Owner	8.071	10.649	-2.950	-2.451	-0.708	-0.929	-0.003	-0.003
	(6.969)	(6.985)	(4.247)	(4.561)	(0.859)	(0.869)	(0.000)	(0.007)
Obs	3,809	3,699	3,809	3,699	3,809	3,699	3,809	3,699
				5 years after entry				
Owner	-0.649	8.159	0.453	1.223	1.516	1.501	-0.044**	-0.044**
	(10.134)	(10.100)	(6.147)	(6.134)	(1.077)	(1.068)	(0.021)	(0.018)
Obs	2,394	2,332	2,394	2,332	2,394	2,332	2,394	2,332
Clust SE	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own
Controls	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Mun FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit

Table A6, Appendix. **Misallocation at Entry, Cummulative Effect. Tradable industries.** This table reports estimates for the cummulative effect from years 1–5 after entry into entrepreneurship of owners (*Owner*) on the average returns to capital and labor (*larpk* and *larpk*), capital expenditures (*capex*), and innovation decisions (*r&d*) for Tradable industries only. All regressions include municipality fixed effects and industry-by-year fixed effects (2-digit NACE). Standard errors are reported in parentheses and are clustered at the municipality-by-ownership level. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively. *Data Source:* Statistics Norway (SSB).

	larpk		larpl		capex		r&d	
	1	2	3	4	5	6	7	8
				1 year after entry				
Owner	5.296	12.451***	6.549***	6.708***	-2.724***	-2.440***	-0.013**	0.002
	(3.935)	(3.913)	(1.788)	(1.771)	(0.546)	(0.523)	(0.006)	(0.004)
Obs	9,732	9,301	9,732	9,301	9,732	9,301	9,732	9,301
				2 years after entry				
Owner	6.925*	15.327***	3.482*	3.776**	-2.622***	-2.493***	-0.012**	-0.002
	(3.557)	(3.329)	(1.823)	(1.782)	(0.318)	(0.308)	(0.005)	(0.003)
Obs	16,635	15,934	16,635	15,934	16,635	15,934	16,635	15,934
				3 years after entry				
Owner	6.627*	14.639***	3.310*	3.562**	-2.424***	-2.255***	-0.016***	-0.006**
	(3.678)	(3.356)	(1.882)	(1.800)	(0.272)	(0.250)	(0.004)	(0.003)
Obs	21,941	21,076	21,941	21,076	21,941	21,076	21,941	21,076
				4 years after entry				
Owner	6.293*	13.359***	2.580	2.787	-2.303***	-2.201***	-0.014***	-0.006**
	(3.719)	(3.412)	(1.943)	(1.879)	(0.240)	(0.224)	(0.004)	(0.003)
Obs	25,750	24,775	25,750	24,775	25,750	24,775	25,750	24,775
				5 years after entry				
Owner	5.390	12.124***	1.879	2.106	-2.212***	-2.090***	-0.017***	-0.009***
	(3.830)	(3.450)	(2.074)	(1.989)	(0.224)	(0.213)	(0.004)	(0.003)
Obs	28,144	27,107	28,144	27,107	28,144	27,107	28,144	27,107
Clust SE	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own	Mun*Own
Controls	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Mun FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit	2-digit