NBER WORKING PAPER SERIES

HOUSING COLLATERAL AND ENTREPRENEURSHIP

Martin C. Schmalz
David A. Sraer
David Thesmar

Working Paper 19680
http://www.nber.org/papers/w19680

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
November 2013

For helpful comments and discussions we would like to thank Sugato Bhattacharyya, Markus Brunnermeier, Denis Gromb, Antoinette Schoar, José Scheinkman, Philip Strahan, as well as seminar participants at IDC, the University of Michigan, the University of Amsterdam, the 10th Annual Corporate Finance Conference at Olin Business School, and the CEPR European Workshop on Entrepreneurship Economics. All errors are our own. David Thesmar thanks the HEC foundation for financial support. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 19680
November 2013
JEL No. G3

ABSTRACT

This paper shows that collateral constraints restrict entrepreneurial activity. Our empirical strategy uses variations in local house prices as shocks to the value of collateral available to individuals owning a house and controls for local demand shocks by comparing entrepreneurial activity of homeowners and renters operating in the same region. We find that an increase in collateral value leads to a higher probability of becoming an entrepreneur. Conditional on entry, entrepreneurs with access to more valuable collateral create larger firms and more value added, and are more likely to survive, even in the long run.

Martin C. Schmalz
University of Michigan
701 Tappan St
R5456
Ann Arbor, MI 48109
schmalz@umich.edu

David Thesmar
HEC Paris
1 rue de la libération
78351 Jouy-en-Josas cedex
France
thesmar@hec.fr

David A. Sraer
Princeton University
Bendheim Center for Finance
26 Prospect Avenue
Princeton, NJ 08540
and NBER
dsraer@princeton.edu

"Higher home prices can stoke the economy by providing owners with more valuable collateral to borrow against for other purchases; many entrepreneurs fund their business this way." *The Economist,* Oct 19, 2013.

1. Introduction

This paper provides evidence that entrepreneurs face credit constraints, which restrict firm creation, post-entry growth, and survival, even over the long run. The existing literature documents a strong correlation between entrepreneurial wealth and the propensity to start or keep a business (Evans and Jovanovic, 1989; Evans and Leighton, 1989; Holtz-Eakin et al., 1993). However, a considerable debate is waging about whether such a correlation constitutes evidence of financial constraints. For instance, individuals who experience a wealth shock, through personal accumulation or inheritance, may also experience an expansion of business opportunities for reasons unrelated to their wealth (Hurst and Lusardi, 2004). In this case, policies aimed at facilitating the financing of new businesses would not increase welfare. Worse yet, in the absence of financial constraints, positive shocks to entrepreneurial wealth may lead to excessive investment, provided that entrepreneurs derive private benefits from remaining in business (Andersen and Nielsen, 2011; Nanda, 2011). On the other hand, if financing frictions lead to underinvestment and fewer than optimal business starts, public intervention in favor of small firm financing may be welfare improving. For these reasons, the question of whether financing constraints significantly hinder firm creation and growth carries important policy implications.

To contribute to this debate, this paper uses variations in local house prices, combined with micro-level data on home ownership by entrepreneurs.[1] We employ a difference-in-differences approach. We compare entrepreneurial outcomes of entrepreneurs owning a house and entrepreneurs renting a house, and compare this difference across geographic regions with different house price dynamics. The comparison between owners and non-owners allows us

[1]We refer to all owners of newly created businesses as "entrepreneurs."

to filter out local economic shocks that may drive the creation, growth, and survival of local businesses. This approach is similar to Chaney et al. (2012), who document the effect of collateral values on the investment of publicly traded corporations in the United States.

We investigate both the extensive and intensive margin of entrepreneurship, that is, entry decisions as well as post-entry growth. Our investigation starts with firm growth and survival, conditional on entry. We construct a large cross section of French entrepreneurs starting a businesses in 1998. Combining survey data and administrative data, we are able to observe a variety of personal characteristics, in particular, the home location of the entrepreneurs, as well as their home-ownership status. We match this information to firm-level accounting data of the newly created firms for up to eight years following creation. We find that in regions with greater house price growth in the 1990s, firms started by homeowners in 1998 are significantly larger and more likely to survive than firms started by renters. In other words, the difference in the size of businesses created by owners and renters is larger in regions in which house prices have appreciated more in the past five years. This effect is robust to controlling for a large set of entrepreneurial characteristics. It is also persistent: in 2005, firms started by entrepreneurs with lower collateral values in 1998 remain significantly smaller in terms of assets, sales, employment, or value added. Finally, this effect is economically large: going from the 25th to the 75th percentile of house price growth in the five years preceding creation allows homeowners to create firms that are 6.5% larger in terms of total assets.

We then verify how collateral shocks affect the probability of starting a business, that is, the extensive margin of entrepreneurship. To this end, we use a different dataset, the French labor force survey, which is a rotating panel that tracks randomly selected individuals for three consecutive years. Importantly, these data contain information on home ownership, geographic location, and entrepreneurial activity. We find that homeowners located in regions where house prices appreciate more are significantly more likely to create businesses, relative to renters located in the same regions. In other words, the difference between owners and renters in the propensity to start a business is larger in regions in which house prices

appreciated more in the past. Again, the effects are economically sizable. Going from the 25th to the 75th percentile of past house price growth increases the probability of firm creation by homeowners, relative to renters, by 9% in our preferred specification. We confirm the importance of this result in the aggregate: total firm creation at the regional level is more correlated with house prices in regions where the fraction of homeowners is larger.

This paper contributes to the literature on financing constraints and entrepreneurship. The extant literature focuses on the link between entrepreneurial wealth and firm creation, growth, or survival. Robb and Robinson (2013) document that debt is a large source of financing for start-ups (approximately 44%) and that its availability is related to the scarcity —and therefore the value— of real estate collateral. Hurst and Lusardi (2004) and Adelino et al. (2013) are closest to our paper, because they also investigate the role of housing wealth on firm creation. However, our paper makes two significant advances relative to these papers: (1) the information on individual homeownership allows us to control for local economic shocks that might create a spurious correlation between entrepreneurial rate and local house prices, and (2) the nature of our data allows us to track not only firm creation (the extensive margin), but also post-entry growth and survival over a long horizon (the intensive margin).

Several earlier papers focus on the role of inheritance shocks to firm quality and survival. Holtz-Eakin et al. (1993) find that firms started after a large inheritance are more likely to survive, a finding they interpret as evidence of credit constraints. By contrast, using Danish data, Andersen and Nielsen (2011) find that businesses started following a large inheritance have lower performance. This finding suggests the relationship between wealth and entrepreneurship may be driven by private benefits of control, or in other words, that business ownership has a luxury-good component (Hurst and Lusardi, 2004). The relation between wealth shocks and post-entry growth/survival thus remains an open discussion. Our paper contributes to this debate by looking at wealth shocks generated by local variations in house prices for homeowners. Arguably, these shocks are much less likely to be correlated with the unobserved heterogeneity in entrepreneurial outcome than inheritance shocks. Fra-

cassi et al. (2012) also provide a clean identification on the role credit constraints play small business survival, by exploiting a discontinuity in the attribution of loans to start-ups at a small local bank. In a similar vein, Black and Strahan (2002) find that banking deregulations in U.S. states led to a large increase in firm creations. Whereas these papers focus on the effect credit supply on firm creation and survival, our paper focuses on credit demand via the supply of collateral.

Our paper also contributes to the emerging literature on the link between economic activity and collateral values (Black et al., 1996; Bernanke and Gertler, 1986; Kiyotaki and Moore, 1995), particularly real estate collateral. When house prices increase, firms and households have more collateral to pledge, which raises borrowing capacity. On the credit-supply size, banks, balance sheets become stronger, which allows them to lend more. Recent papers have documented the link between house prices and household borrowing and consumption (Mian et al., 2011; Gan, 2010), the link between real estate prices and corporate investment (Gan, 2007a; Chaney et al., 2012), and the link between real estate bubbles and bank lending (Gan, 2007b). Our paper shows that entrepreneurial activity also strongly reacts to changes in the value of collateral available to potential entrepreneurs.

The paper has four remaining sections. Section 2 describes the data we use. Section 3 lays out the empirical strategy. We describe and comment on the results in section 4. Section 5 concludes.

2. Data

The paper uses three different sets of data. The first is a random sample of one sixth of all entrepreneurs starting a firm in France in 1998, with detailed information on both the entrepreneur herself and the firm she creates, every year until 2005 or firm exit. We use this sample to investigate the impact of housing wealth on post-entry growth and survival. We call this dataset the intensive-margin sample. The second dataset is a representative

three-year rotating panel of French individuals, covering the 1990-2002 period, with detailed information on occupation and personal characteristics, but no information on post-entry growth. We use this sample to investigate how shocks to housing wealth affect the propensity to start a business. We call this dataset the extensive margin sample. The third dataset directly uses aggregate (e.g., regional and exhaustive) data on firm creation, homeownership rate, and house price fluctuations. This last dataset allows us to confirm, using alternative data sources, that our microeconomic findings on firm creations are still present at a more aggregated level.

2.1. Intensive-Margin Sample

We construct this first dataset from the 1998 wave of the SINE survey (see Landier and Thesmar (2009) for a thorough description of this data source). The French statistical office (INSEE) runs this survey every four years, sending questionnaires to the selected firms. Due to its administrative nature, the survey response rate is high (85%). The survey contains detailed information on the entrepreneur (age, education, work experience, etc.) and her project (ambition, industry, scope, form of business, etc.). It selects a random sample of approximately one third of all firms started in France during the first semester. It consists of both "new" start-ups as well as existing firms taken over by new entrepreneurs. We focus only on the first category. Importantly for our purpose, the survey asks the entrepreneur whether she owns or rents her private home.[2]

To measure post-entry growth, we use accounting information from the tax files from the Finance Ministry. These files, available yearly from 1999 to 2005, cover all firms that are subject to either the regular corporate tax regime (Bénéfice Réel Normal) or to the simplified corporate tax regime (Régime Simplifié d'Imposition). Together, these data cover about 55% of newly created firms. The remaining 45% correspond to very small firms. Indeed, firms

[2]Other waves of this survey (1994, 2002, 2006) exist, but the 1998 wave is the only one that has information on homeownership. This data limitation forces us to focus on a single cross section of data for the post-entry growth analysis. Our analysis on the decision to start a business does not face such constraints.

with annual sales below 32,600 Euros (81,500 Euros in retail and wholesale trade) can opt out and choose a simplified account reporting (Micro-Entreprise), in which case they do not appear in the tax files. The tax files contain detailed accounting information. For the purpose of this study, we retrieve information on location, total assets, total sales, financial debt, number of employees, value added, and the wage bill. As in the SINE survey, each firm in the tax file is uniquely identified by its SIREN number, a feature we exploit to match the two datasets.

We collect information on house prices from the office of French notaries. These data are available annually from 1985 at the level of the "région." France has 21 such districts, with an average population of 3.1 million inhabitants. For each région, we calculate the cumulative house price from 1992 to 1997 as our measure of housing capital gains for entrepreneurs that are homeowners. This measure of the cross-sectional variability in housing wealth is clearly noisy because unobserved variation exists in leverage and the date on which the house was purchased. This measurement error may generate an attenuation bias so that our results should be interpreted as lower bounds on the true effects.

The 1998 wave of the SINE survey conveys a total of 21,871 new start-ups. From this initial sample, we restrict our sample to firms for which we have accounting information in the 1999 tax files. The sample size drops to 11,745 observations. Then, we restrict ourselves to start-ups that have information on all the variables we include in our regression analysis: homeownership (our key explanatory variable) and other control variables (prior occupation, age, education, gender, business form, industry, and firm location). We end up with a sample of 9,173 firms.

Table I presents summary statistics of the intensive-margin dataset. Panel A reports the distribution of house price growth from 1992 to 1997 across the 21 geographic regions. Over the 1992 to 1997 period, real estate prices grew by 3% on average (median of 3% as well). Importantly for our identification strategy, significant heterogeneity exists across régions, from flat prices at the 25^{th} percentile to +9% at the 75^{th} percentile. Out of the 21 régions

in France, two experienced house price declines in that period. In particular, *Ile-de-France*, the région containing Paris, experienced a severe decline of house prices by more than 20% over the period.

Panel B reports the firm characteristics we use as controls in our regression analysis for the first whole fiscal year after creation, that is, in 1999. The average firm has 131k euros in assets, 208k euros in sales, 102k euros of debt, and close to two employees. Average value added (revenue less outside purchases of materials and services) is 130k euros, of which 49k euros correspond to wage payments (total employee compensation). As expected, all these variables have positive skewness: in the median firm, the owner is the firm's only employee. Table A.I compares characteristics of owners and renters. The differences in observables are not economically large, but statistically significant, which is why we include these observables as interacted controls in our regressions (see below). Table A.I shows that homeowners run smaller businesses, create less value added, and are less educated than renters. These unconditional comparisons of owners and renters reject the notion that homeowners are richer, more educated, or otherwise more able to run a business.

Panel C describes the personal characteristics of the entrepreneurs in our sample. In this large, representative sample of entrepreneurs, we find that self-employment accounts for a large fraction of the sample, which is consistent with U.S. studies (Hurst and Pugsley, 2012). Only 23% of the entrepreneurs in our sample have a university degree, and 41% have vocational training comparable to an associate's degree in the United States. Before starting their business, 36% of respondents were unemployed and 10% were inactive. Many of these businesses are not incorporated. Forty-two percent take the legal form of a sole proprietorship, a number similar to Levine and Rubinstein (2013). Figure 1 reports the industry distribution of the firms in our sample. As expected in a representative sample of start-ups, construction, retail, and consulting are the most common industries in which new businesses get started.

Overall, because of the large fraction of uneducated, formerly unemployed individuals,

the homeownership rate among entrepreneurs is relatively low. In this sample, only 29% of these entrepreneurs are homeowners, whereas, in 2010, 58% of households in France own their house.

2.2. Extensive Margin Sample

Our second dataset uses the yearly waves of the French Labor Force Survey from 1990 to 2002 ("Enquête Emploi"), a three-year rotating panel, which is in many ways similar to the US PSID. The unit of observation is the home address, so that the survey misses households that move. However, conditional on respondents staying in the same home, this survey allows us to observe transitions from employment to entrepreneurship/self-employment during the three years in which an individual is surveyed. Importantly for our purpose, these data also contain information on home ownership, as well as on the geographic location of the respondent.

We focus on observations corresponding to individuals that are surveyed for the second time, that is, individuals who are staying in the sample for one more year. We also restrict ourselves to household heads ("personne de référence"). Given that we are studying housing collateral, only one person per household should be able to pledge the household's house to outside investors. This person is likely to be the head of the household. We also drop retirees and students from the original sample, as well as individuals under 20 or older than 64. Because we are studying the transition into entrepreneurship, we also drop existing entrepreneurs. Table II, panel B, presents summary statistics for this selected sample. Fifty-seven percent of individuals surveyed own their house and 6% are unemployed. The median respondent is 43 years old. Fifteen percent of respondents are women and 6% are foreigners. Finally, 37% of the respondents have no diploma, whereas 10% have a college degree.[3] For each individual in this selected sample, we then create a dummy equal to 1 if the data show

[3]Table A.II compares characteristics of owners and renters. While new entrepreneurs who own a house are less educated and have smaller businesses, in the general population, wealth and education are correlated with home ownership.

that the individual starts a business in the following year, which corresponds to year 3 for this individual. The average probability of transition into entrepreneurship is 1.3%.

We then merge this dataset with a sample of regional house prices. We use regional house prices to calculate, each year t and within each region, the cumulative growth of house prices between year $t-6$ and year $t-1$. As explained in the previous section, from 1990 to 1998, house price growth data are available at the région level. From 1998 onward, house price growth data become available at a finer level — the level of the "département." A département is a French administrative district, with an average population of 600,000 inhabitants.[4] To increase the precision of our measure of cumulative house price growth, we use the finest level of granularity available. As an illustration, consider a département d located in région r. To calculate the cumulative house price growth in département d from 1995 to 2000, we first compute house price growth in région r from 1995 to 1998, and then use house price growth in département d from 1998 to 2000. This approach allows us to make the most efficient use of our data but is not crucial for our results, which are robust to using région-level prices throughout. In our regression analyses, we adopt the conservative approach of including département fixed effects, while clustering error terms at the level of the région.[5] Table II reports summary statistics for cumulative house price growth. The median rate of five-year regional house price growth in our sample period is 12%. Substantial cross-regional heterogeneity exists: the standard deviation of five-year house price growth is 20%.

2.3. Aggregate Data

As a complement to our individual-level results on the decision to start a business, we run aggregate regressions at the département level. This alternative procedure is a useful double-

[4]France has 90 département and 21 régions. Départements are roughly the same size as an MSA in the United States.

[5]The small number of clusters has the potential to create a downward bias in the estimation of standard errors (Angrist and Pischke, 2008). In our case, however, clustering at the région level provides larger standard errors than clustering at the dèpartement level. We thus report these more conservative standard errors.

check of our results because (1) we expect our micro-economic results to be visible at a more aggregated level and (2) we can use alternative, exhaustive datasets.

In terms of variables, we compute the fraction of homeowners in 1990 using the (exhaustive) 1990 census, defined as the fraction of first houses (as opposed to secondary houses) in the département that are owned by their occupants. We measure firm creation at the département level by aggregating information from the Business Creation Registry maintained by the French statistical office (INSEE). This dataset contains the universe of firms created in France with their precise date, location, legal form (limited liability corporation or sole proprietorship), and employment at birth. To make results comparable with those from the "extensive margin sample," we focus on the 1990-2002 period. We also obtain information from INSEE on the industry composition of the workforce, by département. We use this last piece of information as a time-varying control. Table II, panel C, presents summary statistics for this sample.

3. Empirical Strategy

We perform three sets of empirical analyses. The first focuses on the intensive margin of entrepreneurship, namely post-entry growth of newly created businesses conditional on entry, at the individual level. The second focuses on the extensive margin of entrepreneurship, namely the probability of entry into entrepreneurship at the individual level. The third focuses on the extensive margin of entrepreneurship, but at the aggregate (département) level.

3.1. Intensive Margin Regressions

To study post-entry growth and survival, we estimate the following regression, where i is an entrepreneur/firm and j is the région of location of the entrepreneur:

$$Y_{ij}^{1999} = \alpha + \beta \cdot D(owner)_i \times \Delta p_j^{1992 \to 1997} + \theta \cdot D(Owner)_i + \gamma \cdot Z_i + \tau \cdot Z_i \times \Delta p_j^{1992 \to 1997} + \delta_l + \varepsilon_{i,j}. \tag{1}$$

The 1999 upper script denotes the fact that the outcome variable is measured in 1999, that is, for the first whole fiscal year after creation, which occurs in 1998. The outcome variables we consider are the logarithm of total assets, total sales, total debt, number of employees, value added, and total wage bill. $D(owner)$ is a dummy equal to 1 if the entrepreneur is a homeowner. $\Delta p_j^{1992 \to 1997}$ is real estate price growth in région j from 1992 to 1997. δ_l are département fixed effects. The Z_is are control variables for the business owner (occupation previous to becoming an entrepreneur, age, education, gender) or for the firm she creates (legal form of the business — sole proprietorship or limited liability corporation — industry, whether the business is operated from the private home of the entrepreneur or elsewhere). These controls are also interacted with $\Delta p_j^{1992 \to 1997}$. We cluster error terms at the région level.

Equation (1) can be interpreted as a difference-in-difference strategy. The first difference can be thought of as a comparison between the size of new businesses created by homeowners in regions with high house price growth from 1993 to 1998 and regions with low house price growth from 1993 to 1998. Intuitively, if entrepreneurs need real estate collateral in order to access external financing, homeowners should be able to create larger firms in regions that recently experienced large real estate inflation relative to regions with smaller house price appreciation. Renters should be thought of as a "control" group: a group of entrepreneurs who are not exposed to variations in collateral values (the treatment) but who are exposed to similar local demand shocks / investment opportunities as homeowners (the "treated" group). A positive β coefficient— our coefficient of interest— in equation (1) would indicate that,

in regions with high house price growth, homeowners create larger firms than renters and this relative to regions with smaller house price growth. The null hypothesis that collateral values are irrelevant for entrepreneurial activity would lead to $\beta = 0$.

The comparison between renters and homeowners is the key difference between our approach and what people have traditionally done in the literature (Hurst and Lusardi (2004) and Adelino et al. (2013)). Our approach relies on the identifying assumption that the size gap between firms created by homeowners and renters is independent of the local housing market, except for the role played by collateral.

Of course, this assumption is strong, because entrepreneurial characteristics might exist that correlate both with the propensity to own a house and with the sensitivity of investment opportunities to the local market. For instance, older entrepreneurs could be more likely to both own a house and start a business in industries that have greater exposure to local economic activity, for example, in retail. If indeed the elasticity of size at creation to past house price appreciation depended on unobserved characteristics that themselves determine ownership, this would invalidate our identifying assumption. Specifically, a correlation between individuals' tendency to own a home and to start businesses in more cyclical industries would introduce an upward bias in the estimation of β. Although we cannot test the identifying assumption, we partially alleviate this concern by controlling in equation (1) for a variety of personal/firm characteristics that might be correlated with the own-versus-rent decision and might also be correlated with the sensitivity of investment opportunities to local economic activity. Precisely, we include controls for the business owner (occupation previous to becoming an entrepreneur, age, education, gender) and for the firm she creates (legal form of the business — sole proprietorship or limited liability corporation — industry, whether the business is operated from the private home of the entrepreneur or elsewhere). By interacting these variables with our price growth variable in equation (1), we ensure our effect is not driven by composition effects arising from renters having different observable characteristics than homeowners.

In spite of these controls, one possible concern with the interpretation of equation (1) is that renters may also be affected by changes in housing prices. If rents respond rapidly to changes in house prices, rising house prices can generate a negative income shock to renting households. In the presence of financial constraints, this may limit their ability to start a business, and the coefficient β in equation (1) would reflect both the collateral shock for owners, and the negative income shock for renters. Although both stories are to some extent similar —they rely on some form of financing constraint— we believe the collateral story is much more credible because empirically, rents fluctuate much less than house prices. Although long-term data on rents are not available in France, the French statistical office has shown in a recent study that from 1996 to 2010, real house prices have risen by some 85%, while real rents have only risen by 8% over the same period (Gallot et al., 2011). To confirm this result over a longer period and in the absence of French data, we use rent and house price data for the United States from Davis et al. (2008) for the 1960-2013 period. We find an average elasticity of the five-year real rent growth to the five-year real price growth of 0.15 (see Figure A.I). This estimate is slightly larger than what French data suggest, consistent with the fact that in France, individual renting contracts have a five-year maturity during which rents cannot be increased faster than inflation. Overall, because rent only weakly responds to changes in house prices, even in the long run, we expect the collateral effect on owners to largely dominate the effect on the cash flows of renters.

We also investigate how access to valuable collateral affects entrepreneurial outcome in the long run. To this end, we estimate equation (1) but replace the outcome variables measured in 1999 with the same outcome variables measured in later years (up to 2005). This analysis is conditional on the firm's survival. We separately examine the role of financing constraints on survival, by using a survival dummy for various horizons (2, 3, 4, and 5 years) as a dependent variable in equation (1).

3.2. Extensive Margin Regressions

To study the decision to start a business, we estimate the following specification, for an individual i, located in département j and year t:

$$\begin{aligned}\mathbb{P}r[E_{i,j,t+1}=1|E_{i,j,t}=0] = \quad & \alpha+\beta\cdot D(owner)_{i,t}\times\Delta p_{j,t-6\to t-1}+\theta\cdot D(Owner)_{i,t}\\ & +\gamma\cdot Z_{i,t}+\tau\cdot Z_{i,t}\times\Delta p_{j,t-6\to t-1}+\delta_j+\varepsilon_{i,j,t}, \qquad (2)\end{aligned}$$

where $E_{i,j,s}$ is a dummy variable equal to 1 if individual i living in département j is an entrepreneur at date t. The rotating panel structure of our data allows us to observe these transitions (see section 2.2 for details on the construction of the sample). β is the coefficient of interest. $\Delta p_{j,t-6\to t-1}$ is the cumulative house price growth in département j between year $t-6$ and year $t-1$.[6] Note that house price growth is now indexed with time t, because we employ a panel dataset for this regression. Controls Z_i are now: education dummies, gender, foreign/national dummy, past-year wage (or unemployment insurance benefit if unemployed), a dummy for past-year work status (employed vs. unemployed), and age. As before, standard errors are clustered at the région level. Equation (2) is estimated using a probit model, but we check the robustness of the results using a linear probability model. As in equation (1), the coefficient β is the focus of our analysis. If the availability of housing collateral affects the decision to start a business, we expect that $\beta > 0$.

The identification of equation (2) follows a logic similar to equation (1), but a key difference is that we observe firm creations over 1990-2002, which brings additional identifying power from the time series of house prices. To see how, notice that within each region and for each year, we compare homeowners' versus renters' propensity to start a business. The coefficient β is then identified both on the cross-sectional and time-series variations of this difference. In the cross-section, the estimate of β is larger if regions with higher house price growth experience more firm creation by owners than renters (this source of identification is

[6] As explained in section 3.2, before 1998, we compute département-level house price growth, using the corresponding région-level house price growth.

similar to that used in equation (1)). In the time-series, the estimate of β is larger when the relative entrepreneurial activity of owners and renters co-moves with accelerations in house prices. This second source of identification is specific to this "extensive" margin analysis.

3.3. Aggregate Extensive-Margin Regressions

In this section, we investigate the aggregate effects of the collateral channel for entrepreneurship. We estimate the following specification on our département-level dataset, where j is a département and t is the year:

$$\begin{aligned}\frac{\text{New Firms}_{j,t}}{\text{Pop}_{j,t}} = \quad & \alpha + \beta \cdot \%owners_j^{1990} \times \Delta p_{j,t-6\to t-1} \\ & + \tau \cdot Z_j^{1990} \times \Delta p_{j,t-6\to t-1} + \delta_j + \eta_t \varepsilon_{i,j}. \end{aligned} \tag{3}$$

$\%owners_j^{1990}$ is the fraction of homeowners in département j in 1990, $\Delta p_{j,t-6\to t-1}$ is house price growth in the five years preceding year t, δ_j are département fixed effects, and η_t are year fixed-effects. $\frac{\text{New Firms}_{j,t}}{\text{Pop}_{j,t}}$ is the ratio of newly created firms to a measure of population in year t in département j. For the main regression, new firms consist only of limited liability corporations and corporations, because data on creation of sole proprietorship are available only from 1993 onward. In an unreported robustness check, we verify that our effect holds when we consider all new firms, creation starting in 1993. In our preferred specification, the normalization variable $\text{Pop}_{j,t}$ consists of the number of "active households" in the region. It corresponds to the number of households whose head is active in the labor force and between 20 and 65 years old. We use this normalization —instead of total population— to check that our aggregate results provide estimates that are consistent with our "extensive margin" regressions, which are run on the sample of "active" households.[7]

We also explore the employment effect of these collateral shocks. To do so, we exploit the fact that the exhaustive registry of new firms contains information on the number of jobs

[7]Our results are not sensitive to this normalization choice — they carry through if we normalize, for instance, by total population instead.

at creation. We thus simply use, as an alternative dependent variable in equation (3), the ratio of all jobs in newly created firms (at creation) in a region normalized by the number of active households in this region.

We control for the heterogeneity in the fraction of homeowners in a département by including the following set of covariates: the fraction of the working population in 1990 in the region working in Agriculture, Manufacturing, Construction, Service and non-profit Service (measure available from the French statistical office INSEE), the size of the département measured by its population from the 1990 census, and the logarithm of the median wage in the département, obtained from the labor force survey in 1990. Error terms are clustered at the région level.

4. Results

Our results provide support for the notion that the collateral channel constrains entrepreneurial activity, at both the intensive and extensive margins. We have three sets of results. First, conditional on entrepreneurship, entrepreneurs who start after receiving large housing capital gains in the years prior to entry are able to start larger firms in terms of total assets, employment, sales, value added, and wage bill. Second, employed individuals experiencing large housing capital gains are more likely to start a business than non-homeowners or homeowners living in regions with lower house price growth. Third, in the aggregate, the elasticity of business starts to local house prices is stronger in regions with a higher ownership rate.

4.1. Intensive Margin Individual-level Results

Table III reports the point estimates from the estimation of equation (1). The outcome variables are log assets, log sales, log debt, log number of employees, log of value added, and log of the wage bill. The variable of interest is the interaction of the owner dummy and house price appreciation from 1992 to 1997 (Owner $\times \Delta p$). We control for characteristics of the

business owner (occupation previous to becoming an entrepreneur, age, education, gender), legal form of the business (sole proprietorship or corporation), industry, whether the firm is located in the owner's home or elsewhere, as well as all interactions of these controls with Δp, which we do not report to clarify presentation. The regressions also include département fixed effects. Standard errors are clustered at the région level.

We find significant effects of collateral values on the size of newly created businesses, conditional on business creation. Going from the 25th to the 75th percentile of house price growth from 1992 to 1997 (i.e., a 9 percentage point increase in house price growth) leads to a 15% (=1.7 $\times$ .09) increase in total assets, a 9% (=1 $\times$ .09) increase in total sales and a 2.3% (=.26$\times$ .09) increase in employment. Consistent with the collateral channel, we find this larger scale of operation following housing capital gains is accompanied by larger debt levels: going again from the 25th to the 75th percentile of house price growth leads to a 12% (=.81 $\times$ .09) increase in total debt. We also investigate how the access to more valuable collateral affects the wages paid by the newly created firms, as well as the total valued added. The estimated effect on the total compensation of employees is large (9% increase following a 9-percentage-point increase in house price growth), but it is also noisy (t-stat of 1.6). The imprecision of the estimate may reflect the fact that the owner has discretion over paying herself a salary (which goes into compensation) or a dividend. Total Value Added, measured as sales minus intermediary inputs, is immune to this issue, because value added is the sum of labor and capital incomes (employee compensation, interest payments, retained earnings, and dividends paid). The estimated effect on value added is also large : going from the 25th to the 75th percentile of house price growth leads to a 7% (=.74 $\times$ .09) increase in value added. All the results in Table III are significant at the 1% confidence level except for the effect on total employee compensation. These effects reported in Table III correspond to short-term effects, in the sense that we observe for the first whole fiscal year after creation.

We now investigate the long-term impact of financing constraints. Although we have provided evidence that firms are financially constrained at birth (they start smaller), this

effect might disappear after a few years, as firms accumulate enough profits to self-finance their growth. This possibility is at the heart of the debate on the macroeconomic impact of financing constraints (see Moll (2013) or Midrigan and Xu (2013)). This literature asks whether financing constraints have the power to induce misallocation of capital across firms. One possibility is that financing constraints may induce little misallocation if (1) productivity shocks are persistent and (2) firms can self-finance their growth. Our analysis suggests, however, that financing constraints at birth (i.e., in 1998) have long-term effects (up to 2005).

To establish this fact, we exploit the feature that house price growth from 1992 to 1997, which we use as our measure of collateral gains for owners in 1998, is not correlated with house price growth from 1999 to 2004. Figure 2 plots cumulative house price growth from 1999 to 2004 at the région level against cumulative house price growth from 1992 to 1997. We find a slightly negative –but statistically insignificant– correlation of -.1. Hence firms that we consider collateral rich at birth in 1998 are not the ones that are collateral rich after their creation. We can thus investigate the long-run effects of financing constraints at birth by regressing post-entry size in the 2000s on collateral gains in 1998.

In Figure 3, we show that access to valuable collateral has a persistent effect on firm size, sales, and the other outcome variables. To this end, we modify equation (1) by using Y_{ij}^t as the dependent variable; that is, the outcome variables are now measured in year $t \in [2000, 2005]$ and no longer in 1999. Importantly, house price appreciation is still measured from 1992 to 1997. Figure 3 shows that most of the effects reported in Table III for 1999 are still observed later in the sample period. For instance, in 2005, firms created following larger housing capital gains in the 1990s still have significantly larger sales, value added, and total wage bill. For all outcome variables, the effects estimated throughout the early 2000s are fairly stable and close to their 1999 value reported in Table III. In sum, Figure 3 shows that collateral shocks have a persistent effect on the long-run behavior of newly created firms.

One possible interpretation of results in Figure 3 is that collateral shocks make home-

owners less risk averse, because risk aversion is a decreasing function of wealth. As a result, homeowners would start larger and riskier firms. Because we observe firm growth conditional on survival, the results of Table III and Figure 3 may be evidence of risk-taking: firms started by entrepreneurs with larger housing capital gains are larger if they survive, but would be less likely to survive.

To test for this risk-shifting hypothesis, we estimate equation ((1)) but use as a dependent variable the probability of exiting our accounting data in year t conditional on being in operation in year $t-1$.[8] A positive coefficient on Owner $\times \Delta p$ would indicate collateral-rich firms are more likely to disappear from accounting data —consistently with the risk-taking hypothesis. We report the marginal effects of these probit regressions for all horizons in Table IV, as well as a cumulative probability of exiting the data before 2005. The results show that collateral shocks are not related to subsequent firm exit. The one significant marginal effect in column 5 is economically small, only significant at 10%, and in any case, negative. The last column of Table IV looks at the effect on exit at some point before 2005, which is the accumulation of all hazard rates shown in columns 1-6. Again, the relative availability of collateral in 1999 is not statistically significant and has a negative effect on attrition. Table IV is broadly inconsistent with the hypothesis that access to more valuable collateral increases risk taking.

4.2. Extensive Margin: Individual-level Results

The previous section discussed regressions that estimate the effect of house price appreciation on homeowners' business success conditional on entry. This section looks at the entry decision itself. To this end, we use the panel extracted from the French Labor Force Survey and described in section 2.2. In this sample, the unconditional probability of becoming an entrepreneur is about 1.3%. This section asks whether, relative to renters, this probability is systematically different for homeowners who have experienced substantial housing cap-

[8] To limit the number of independent variables and avoid the incidental-parameters problem, we use région fixed effects instead of département fixed effects.

ital gains in the past five years relative to homeowners in regions with lower house price appreciation.

Table V presents the estimation of equation (2). Columns 1 and 2 report marginal effects from a probit regression. Columns 3 and 4 report results from a linear probability model. Columns 1 and 3 only include region and year fixed effects. Columns 2 and 4 include additional controls (education dummies, previous year income, age, sex, a foreign nationality dummy, and the interaction of these controls with local house price appreciation Δp). All specifications yield positive and statistically significant estimates for the interaction of house price growth and the homeownership dummy.[9] The effects we report are of a sizable magnitude. Using the point estimates from column 4, we find that going from the 25^{th} to the 75^{th} percentile of house price growth (an 18-percentage-point increase) leads to a .11-percentage-point (.0065$\times$ .18) increase in the probability of starting up a business. Because the unconditional probability of starting a business is 1.3%, the estimate corresponds to a 9% increase in the probability of becoming an entrepreneur. Taken together with the results from section 4.1, our results show that access to valuable collateral is a significant determinant of both the decision to become an entrepreneur and the size of the business created, conditional on entry.

We finish this section by emphasizing the importance of controlling for the homeownership status of the individual. In a seminal contribution, Hurst and Lusardi (2004) use data from the PSID to regress the probability of starting a business on past house price appreciation, without interacting the price appreciation with individual or average ownership rates. Hurst and Lusardi (2004) fail to find a significant and positive effect of past house price growth on the entrepreneurship decision and interpret this finding as a rejection of the hypothesis that credit constraints significantly reduce entrepreneurial activity. In Table A.V, we report

[9]Appendix Table A.IV introduces the controls consecutively to show the stability of the estimate to the introduction of the controls. Even previous year income, a proxy for wealth other than housing wealth, leads only to a modest decline in the point estimate, and significance, if anything, increases. The stability of the estimate to the introduction of a plethora of observable controls increases our confidence in the robustness of our main estimation.

results that are consistent with the results in Hurst and Lusardi (2004), that is, a weak, negative relationship between recent past house price appreciation in the region where the individual is located and the decision to become an entrepreneur. In addition to establishing the comparability of our sample with the PSID sample used by Hurst and Lusardi (2004), this table shows how omitting to interact past house price appreciation with the homeownership status can affect the results significantly in our sample at least.

Table A.V also helps rule out one alternative interpretation of our results, which would rely on a form of a bank-lending channel. Assume banks are local and own local real estate. Home price increases would then lead to an increase in credit supply, which might be channeled in priority to collateral owners. This mechanism would be an alternative explanation of our results. If such a story did hold, however, one would expect the point estimate for Δp in Table A.V to be positive and significant. The fact that it is significantly negative tends to rule out this explanation.

4.3. Extensive Margin: Aggregate Results

We have shown in the previous section that regions with lower house price growth experience lower entrepreneurial activity from homeowners living in that region. In this section, we investigate whether these effects aggregate up at the département level using separate, exhaustive census data. To this end, we estimate equation (3) and show that in départements with a larger fraction of homeowners, entrepreneurial activity depends more strongly on past house price growth.

Table VI presents the results of an OLS estimation of equation (3). In this equation, we use two distinct measures of entrepreneurial activity at the département level: (1) the number of firms created per active household (Panel A) and (2) the employment in newly created firms in the département per active household (Panel B). We report both unweighted results (columns 1 and 3) and results weighted by the number of active households in the département (columns 2 and 4). Columns 1 and 2 only include year and département fixed

effects as controls. Columns 3 and 4 also control for the interaction of a region's industry composition, size, and median wage with past house price appreciation. All specifications yield positive and statistically significant coefficients. In our sample, entrepreneurial activity responds significantly more to past increases in house prices in regions with a large fractions of homeowners.

First, we note that the point estimate we obtain in Panel A of Table VI is similar to the point estimate obtained in individual-level regressions, despite the fact that (1) the data are different (Labor Force Survey vs. census data) and (2) the set of control variables differs. Another difference between the two approaches is that our aggregate regressions use 1990 ownership rates from the decennial census, instead of continuously updated information on ownership as in the individual-level regressions of Table V. Without control variables, the aggregate regressions yield a point estimate of .0064 (column 2, Panel A of Table VI), whereas individual survey-based regressions yield .0095 (column 3 of Table V). For regressions including control variables, we obtain .0041 (column 4, Panel A of Table VI) versus .0065 (column 4 of Table V).

Second, the magnitudes we report in Table VI are large, both for the effect of collateral values on business counts and induced job creation. Looking at the number of firms created, column 3 of Panel A —the unweighted specification including the full set of controls— shows that, taken at the median homeownership rate (.58%), a one-standard-deviation increase in Δp leads to an increase in the number of newly created firms by .05 % of the number of active households in the region (.0047×.58×.20). Given that the average region has some 150,000 such households, this percentage corresponds to an increase in the number of new firms by about 80. This number should be compared with the average number of newly created firms in the département, which is about 700 per year. Hence a one-standard-deviation increase in house prices leads to an increase by 13% (= 80/700) of the number of newly created firms in the département. To quantify the effect of collateral values on direct job creation induced by newly created firms, we look at the unweighted estimate with the full set of controls

of column 3, Panel B. At the average homeownership rate, a one-standard-deviation price increase leads to an increase in jobs at newly created firms by 1.2% of the number of active households in the département ($= .011 \times .58 \times .20$). This increase corresponds to about 1,900 jobs by region, or $1,900 \times 95 = 180,000$ jobs nationwide (some 1% of total employment). Of course, highlighting that these estimates represent only partial equilibrium effects is crucial: they do not take into account potential crowding out on incumbent firms or any other form of general equilibrium effects.

We can also quantify the effect of financing constraints on firm and job creation by considering a fictitious economy where the homeownership rate is 100%. At the average price growth rate, which is .15, the estimate from Panel A, column 3 of Table VI suggests that in this counterfactual economy, the number of newly created firms would be higher by about $150,000 \times .0047 \times (1 - .58) \times .15 = 44$ new businesses by region, or a 6% increase. From the results in Panel B, column 3 of Table VI, we infer that an economy with a 100% homeownership rate would see an increase in aggregate employment of about 100,000 jobs. Again, we stress that these counterfactual analyses are only partial equilibrium effects and do not take into account general equilibrium effects that may arise in the counterfactual economy. For instance, incumbent firms may grow less as a result of new firms' entry (see Johan Hombert and Thesmar (2013) for a reduced-form analysis of crowding-out effects).

5. Conclusions

Using variations in local house prices, as well as variations in homeownership, this paper shows that collateral frictions matter for the creation of new firms, as well as for the size of newly created firms, both at the individual and regional level. Our paper highlights another channel through which house prices can affect aggregate activity. This channel is different from the one emphasized by Mian and Sufi (2012), who look at how declining house prices impair the balance sheet of levered households, contributing significantly to a decline in

employment. Our analysis shows that declining house prices will also affect the supply of entrepreneurs, which may in turn deteriorate aggregate activity. Quantifying the relative importance of these two channels is an important task that we leave for further research.

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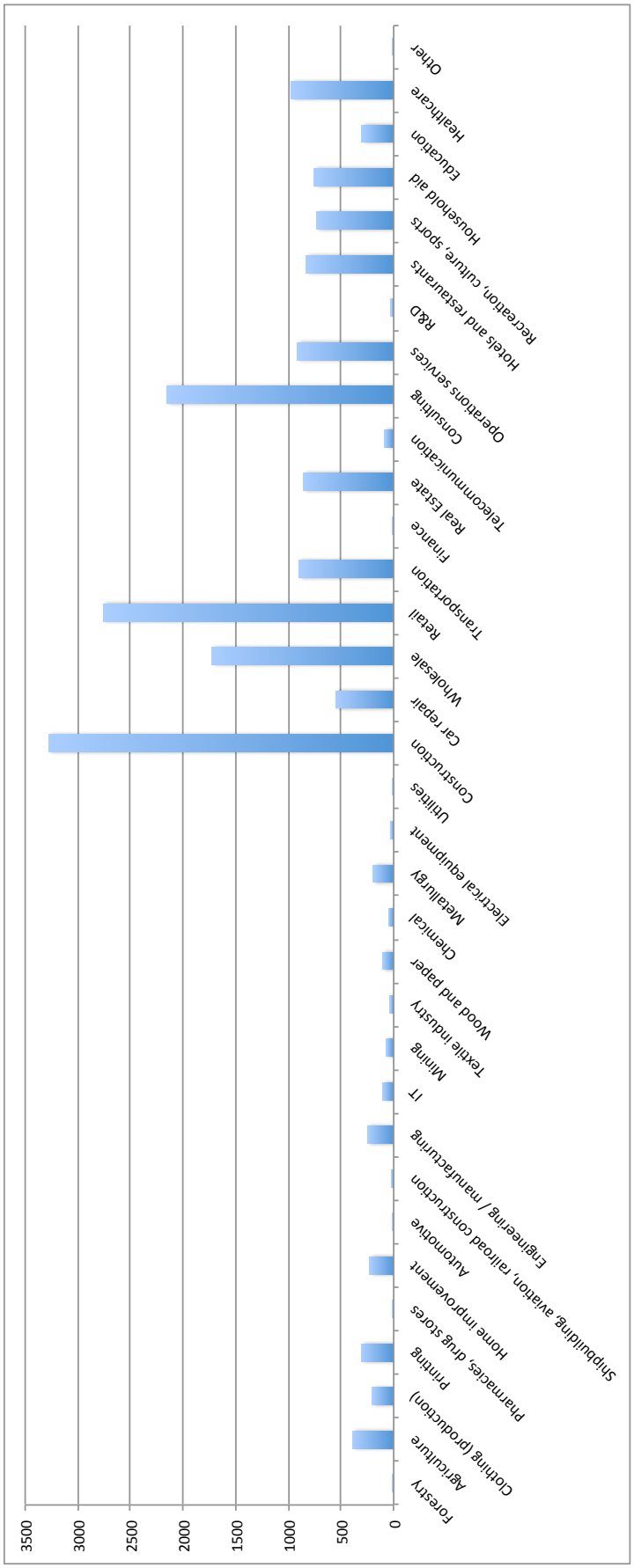

Figure 1: Industry Distribution of Newly Created Businesses.
The graph shows the industry distribution of the businesses created in the first half of 1998 that get selected into our sample.

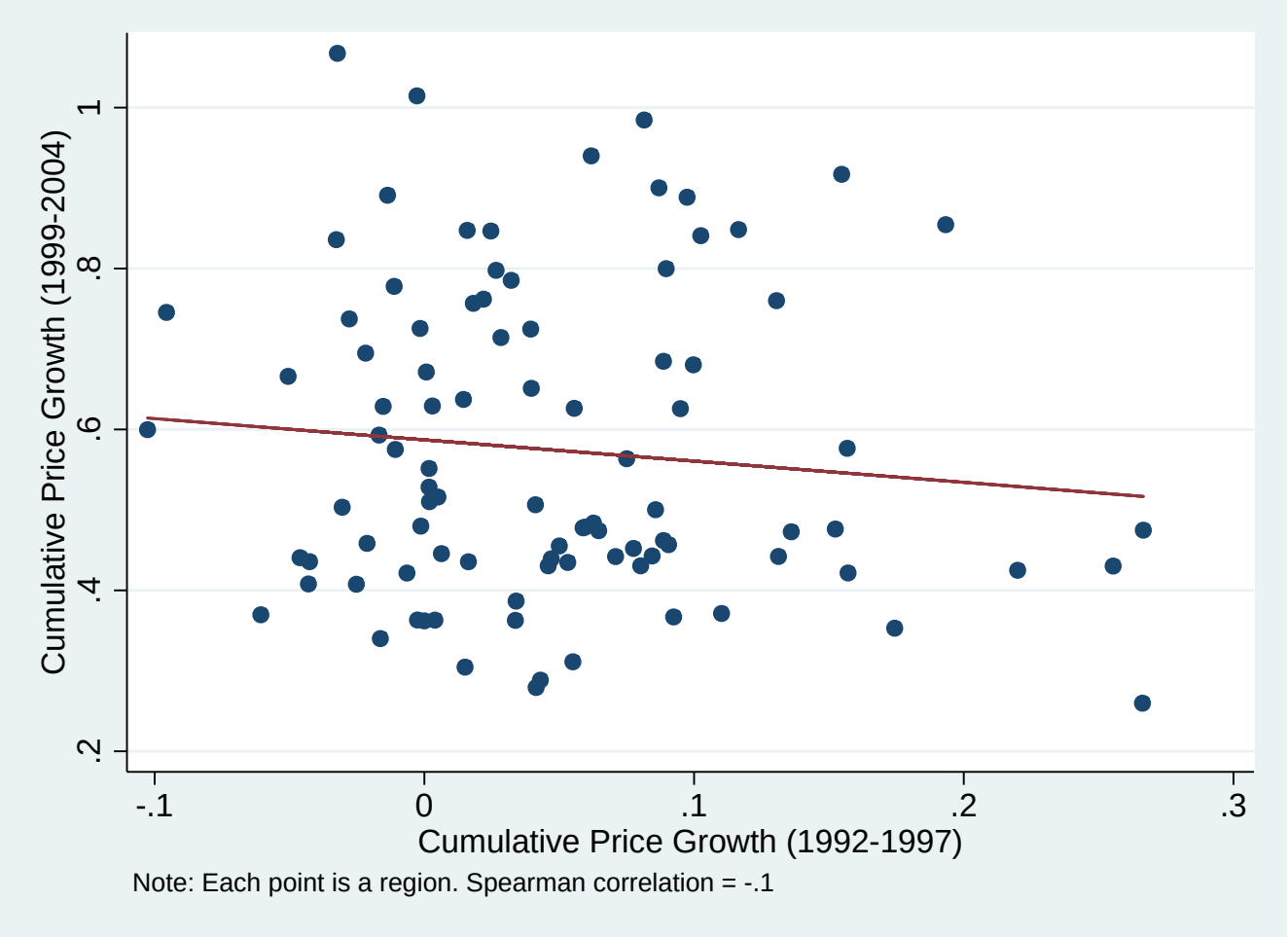

Figure 2: Correlation between Price Growth in 1992-1997 and Price Growth in 1999-2004
Each dot corresponds to one French region ("département"). The sample linear correlation is -.1 and is not statistically significant.

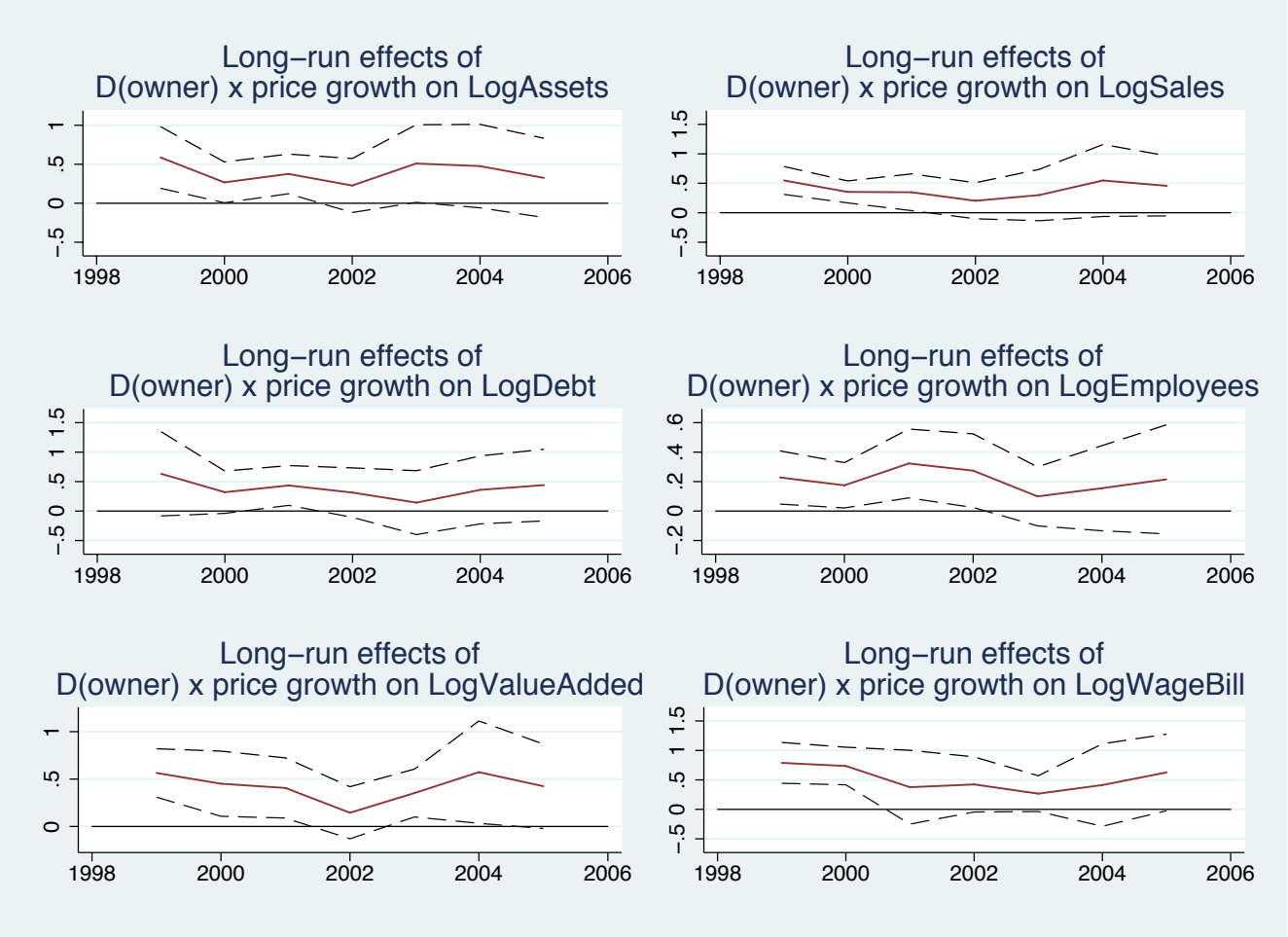

Figure 3: Real Estate Capital Gains and Entrepreneurial Outcomes: Long-run Effects
The graphs plot coefficients and 95% confidence intervals from regressions of year-t entrepreneurial outcomes on the interaction of an ownership dummy and region-level house price growth over the five years prior to creating the firm (1992-1997), Δp. t goes from 1999 to 2002. These regressions control for characteristics of the business owner (occupation previous to becoming an entrepreneur, age, education, gender), legal form of the business (sole proprietorship or corporation), industry, whether the firm is located in the owners home or elsewhere, as well as all interactions of these controls with Δp. The regressions also include region fixed effects. Standard errors are clustered at the regional level.

Table I: Summary Statistics for the Intensive-Margin Analysis.
This table presents summary statistics for the sample we use in our analysis of the effect of real estate capital gains on the size at creation, conditional on starting up a company. Panel A describes house price growth from 1992-1997 across the 21 French regions. Panel B describes the characteristics of firms created by entrepreneurs surveyed in the SINE survey in 1998 and measured in 1999 in the tax file: total assets, total sales, total debt, number of employees, value added, and total wage bill. Panel C describes the characteristics of the entrepreneurs surveyed in the SINE survey in 1998: homeownership status, whether they are sole proprietors, whether they work from home, age, gender, education measured by four dummies (No Diploma, Vocational Training, High School Diploma, College Diploma), occupation previous to starting up a business (Employed, Unemployed, and Out-of-Workforce).

	Mean	Std. Dev.	p(10)	p(25)	p(50)	p(75)	p(90)	Obs.
Panel A: House price growth 1992-1997								
$p_{1997}/p_{1992} - 1$	0.03	0.10	-0.03	0.00	0.03	0.09	0.13	21
Panel B: Firm characteristics (1999 book values, in thousand Euros)								
Asset	131.42	1,069.30	7.01	18.45	40.86	96.35	221.66	9,173
Sales	208.63	1,281.65	14.48	35.06	73.18	171.51	395.15	9,173
Debt	102.24	968.09	3.20	11.28	29.88	76.22	179.43	9,173
# Employees	1.84	6.69	0.00	0.00	0.00	2.00	4.00	9,173
Value Added	130.17	615.05	9.45	23.78	48.78	112.51	248.80	9,173
Total Wage	49.79	218.40	0.30	3.05	12.50	44.82	108.85	9,173
Panel C: Entrepreneur characteristics								
Home Owner	0.29	0.45	0.00	0.00	0.00	1.00	1.00	9,173
Sole Proprietor	0.44	0.50	0.00	0.00	0.00	1.00	1.00	9,173
Business at Home	0.41	0.49	0.00	0.00	0.00	1.00	1.00	9,173
Age	37.51	9.34	26.00	30.00	36.00	44.00	50.00	9,173
Gender (Male==1)	0.77	0.42	0.00	1.00	1.00	1.00	1.00	9,173
Education								
No Diploma	0.18	0.39	0.00	0.00	0.00	0.00	1.00	9,173
Vocational Training	0.41	0.49	0.00	0.00	0.00	1.00	1.00	9,173
High School Diploma	0.18	0.39	0.00	0.00	0.00	0.00	1.00	9,173
College Diploma	0.23	0.42	0.00	0.00	0.00	0.00	1.00	9,173
Prior occupation								
Employed	0.53	0.50	0.00	0.00	1.00	1.00	1.00	9,173
Unemployed	0.36	0.48	0.00	0.00	0.00	1.00	1.00	9,173
Out-of-Workforce	0.10	0.30	0.00	0.00	0.00	0.00	1.00	9,173

Table II: Summary Statistics for the Extensive-Margin Analysis.
This table presents summary statistics for the sample we use in our analysis of the effect of real estate capital gains on the decision to start up a company. The sample period is 1990-2002. Panel A describes house price growth from year t-6 to year t-1 across the 89 French regions used in the analysis. Panel B describes personal characteristics of the individuals surveyed in the Labor Force Survey: a dummy equal to 1 if the individual starts a business, a dummy for homeownership, log of wage in the year previous to the decision to start a business (or the log of unemployment benefits if eligible), dummy if the individual is unemployed, age, gender (2 for male, 1 for female), a foreigner dummy, and education (dummies for College Degree, Some College, High School diploma, Technical Training).

	Mean	Std. Dev.	p(10)	p(25)	p(50)	p(75)	p(90)	Obs.
Panel A: House price growth								
$p_{t-1}/p_{t-6} - 1$	0.15	0.20	-0.01	0.04	0.12	0.22	0.32	1,027
Panel B: Individual characteristics								
Entrepreneurship	0.01	0.11	0.00	0.00	0.00	0.00	0.00	87,104
Homeowner	0.57	0.49	0.00	0.00	1.00	1.00	1.00	87,104
log(wage)	8.77	1.72	8.41	8.78	9.04	9.34	9.67	87,104
Unemployed	0.06	0.24	0.00	0.00	0.00	0.00	0.00	87,104
Age	43.22	8.81	31.00	36.00	43.00	50.00	55.00	87,104
Gender	1.15	0.36	1.00	1.00	1.00	1.00	2.00	87,104
Foreigner	0.06	0.24	0.00	0.00	0.00	0.00	0.00	87,104
Education								
College Degree	0.10	0.30	0.00	0.00	0.00	0.00	1.00	87,104
Some College	0.09	0.28	0.00	0.00	0.00	0.00	0.00	87,104
High School	0.10	0.31	0.00	0.00	0.00	0.00	1.00	87,104
Technical Training	0.33	0.47	0.00	0.00	0.00	1.00	1.00	87,104
No Diploma	0.37	0.48	0.00	0.00	0.00	1.00	1.00	87,104
Panel C: Aggregate characteristics								
# Active households	150596.42	127364.37	39,809.00	62,860.00	111650.00	198347.00	316829.00	1,212
# firms created / # AH (%)	0.38	0.22	0.19	0.24	0.32	0.44	0.62	1,212
# employees in new firms / # AH (%)	0.67	0.38	0.33	0.44	0.57	0.80	1.09	1,212
Fraction homeowners (%)	58.22	7.12	49.84	55.48	58.51	63.03	66.66	1,212
Median wage	5,794.13	580.75	5,200.00	5,450.00	5,747.50	6,000.00	6,500.00	1,212
Workforce composition								
Agriculture	0.08	0.05	0.02	0.04	0.08	0.10	0.15	1,212
Industry	0.21	0.07	0.12	0.17	0.22	0.26	0.31	1,212
Construction	0.07	0.01	0.06	0.07	0.07	0.08	0.09	1,212
For-profit Services	0.36	0.06	0.29	0.32	0.34	0.38	0.45	1,212
Non-profit Services	0.28	0.03	0.24	0.25	0.28	0.30	0.31	1,212

Table III: Real Estate Capital Gains before Creation and Entrepreneurial Outcomes

The table reports the coefficient of regressions of several entrepreneurial outcomes— measured in 1999 (the first entire fiscal year after creation)— on the interaction of regional house price appreciation from 1992 to 1997 (Δp) and a dummy for individual home ownership (Owner). We control for characteristics of the business owner (occupation previous to becoming an entrepreneur, age, education, gender), legal form of the business (sole proprietorship or corporation), industry, whether the firm is located in the owner's home or elsewhere, as well as all interactions of these controls with Δp. The regressions also include region fixed effects. The outcomes we consider are logarithm of total assets (column (1)), logarithm of sales (column (2)), logarithm of total debt (column (3)), logarithm of 1 plus the number of employees (column (4)), logarithm of value added (column (5)), and logarithm of the total wage bill (column (6)). T-statistics are in parentheses. Standard errors are clustered at the regional level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	log(1+Assets)	log(1+Sales)	log(1+Debt)	log(1+#Employees)	log(Value Added)	log(Wage Bill)
	(1)	(2)	(3)	(4)	(5)	(6)
Owner $\times \Delta p$	1.7***	1***	1.3***	.26***	.74***	1
	(4.3)	(5.2)	(3.1)	(3.1)	(3.8)	(1.6)
Owner	.17***	-.18***	.017	-.11***	-.17***	-.38***
	(4)	(-4.8)	(.35)	(-6.6)	(-4.4)	(-5.1)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls $\times \Delta p$	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,173	9,173	9,173	9,173	9,173	9,173
Adj. R2	0.17	0.10	0.20	0.28	0.10	0.12

Table IV: Real Estate Capital Gains before Creation and Subsequent Failure Hazard Rates
This table reports the marginal effect from probit regressions of the failure hazard in year t, fh(t), defined as failure probability in year t conditional on survival until year $t-1$, as a function of the interaction of regional house price appreciation from 1992 to 1997 (Δp) and a dummy for individual home ownership (Owner). The last column (7) uses the probability of failure before 2005 as a dependent variable. We control for characteristics of the business owner (occupation previous to becoming an entrepreneur, age, education, gender), legal form of the business (sole proprietorship or corporation), industry, whether the firm is located in the owner's home or elsewhere, as well as all interactions of these controls with Δp. The regressions also include région fixed effects. Standard errors are clustered at the regional level. Z-statistics are in parentheses. *, **, and *** mean statistically different from zero at 10%, 5%, and 1% levels of significance.

	fh(2000)	fh(2001)	fh(2002)	fh(2003)	fh(2004)	fh(2005)	fh(2000-2005)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Owner $\times \Delta p$	-.085	-.025	.014	.0096	-.086*	-.045	-.15
	(-1.3)	(-.47)	(.26)	(.18)	(-1.9)	(-.86)	(-1.1)
Owner	-.0093	-.061***	-.022***	-.024***	-.022***	-.017	-.1***
	(-1.1)	(-7.2)	(-3.4)	(-3.2)	(-4.3)	(-1.6)	(-6.6)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls $\times \Delta p$	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,164	8,297	7,073	6,629	6,123	5,725	9,169
Pseudo-R2	0.04	0.04	0.04	0.03	0.03	0.02	0.04

Table V: Real Estate Capital Gains before Creation and Probability to Start a Business

The table reports the estimates of regressions of the decision to start-up a company on the interaction of local house price appreciation in the five years prior to the decision (Δp) and a dummy for individual home ownership (Owner). Columns (1) and (2) present estimates from probit regressions. Columns (3) and (4) are linear probability models. In column (1) and (3), we control for region fixed effects and year fixed effects. In columns (2) and (4), we add controls for individual characteristics (education, previous salary, age, sex, whether the entrepreneur is a foreign national), as well as all interactions of these controls with Δp. The regressions also include region fixed effects. T-statistics are in parentheses. Standard errors are clustered at the regional level. *, **, and *** mean statistically different from zero at 10%, 5%, and 1% levels of significance.

	Probability of Entrepreneurship			
	(1)	(2)	(3)	(4)
Owner $\times \Delta p$	.007***	.0019**	.0095***	.0065***
	(6.5)	(2.2)	(7.2)	(5.8)
Owner (d)	.0013	.0022***	.0012	.0039***
	(1.6)	(4.1)	(1.4)	(6.1)
Δp	-.007***	.0077**	-.0083***	.12***
	(-5.3)	(2.3)	(-5.2)	(3.5)
Region FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Controls $\times \Delta p$	No	Yes	No	Yes
Observations	87,104	87,104	87,104	87,104

Table VI: House Price Growth, Ownership Rate, and Local Entrepreneurial Activity
The table reports the estimates of linear regressions of entrepreneurial activity at the region level on the interaction of local house price appreciation in the past five years (Δp) and the fraction of homeowners in the region (% Owner). Columns (1) and (3) are unweighted. Columns (2) and (4) are weighted by the number of active households. Columns (1) and (2) control for year and region fixed effects. Columns (3) and (4) add controls for industry composition, size, and median wage in the region, as well as interactions of these controls with Δp. T-statistics are in parentheses. Standard errors are clustered at the regional level. *, **, and *** mean statistically different from zero at 10%, 5%, and 1% levels of significance.

	Measure of Entrepreneurial Activity			
	(1)	(2)	(3)	(4)
Panel A: # New Firms per "Active" Household				
% owners $\times \Delta p$	.005***	.0064***	.0047***	.0041***
	(4.6)	(13)	(4.2)	(8.4)
Δp	-.0027***	-.0034***	.047***	.028***
	(-5.5)	(-17)	(3)	(3.3)
Panel B: # Jobs in New Firms per "Active" Household				
% owners $\times \Delta p$	.0073***	.0083***	.011***	.0088***
	(2.9)	(5.7)	(4)	(6.2)
Δp	-.003***	-.0036***	.075	.013
	(-3)	(-6.2)	(1.6)	(.46)
Region FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes
Controls $\times \Delta p$	No	No	Yes	Yes
Observations	1,212	1,212	1,212	1,212

A. Appendix Tables and Figures

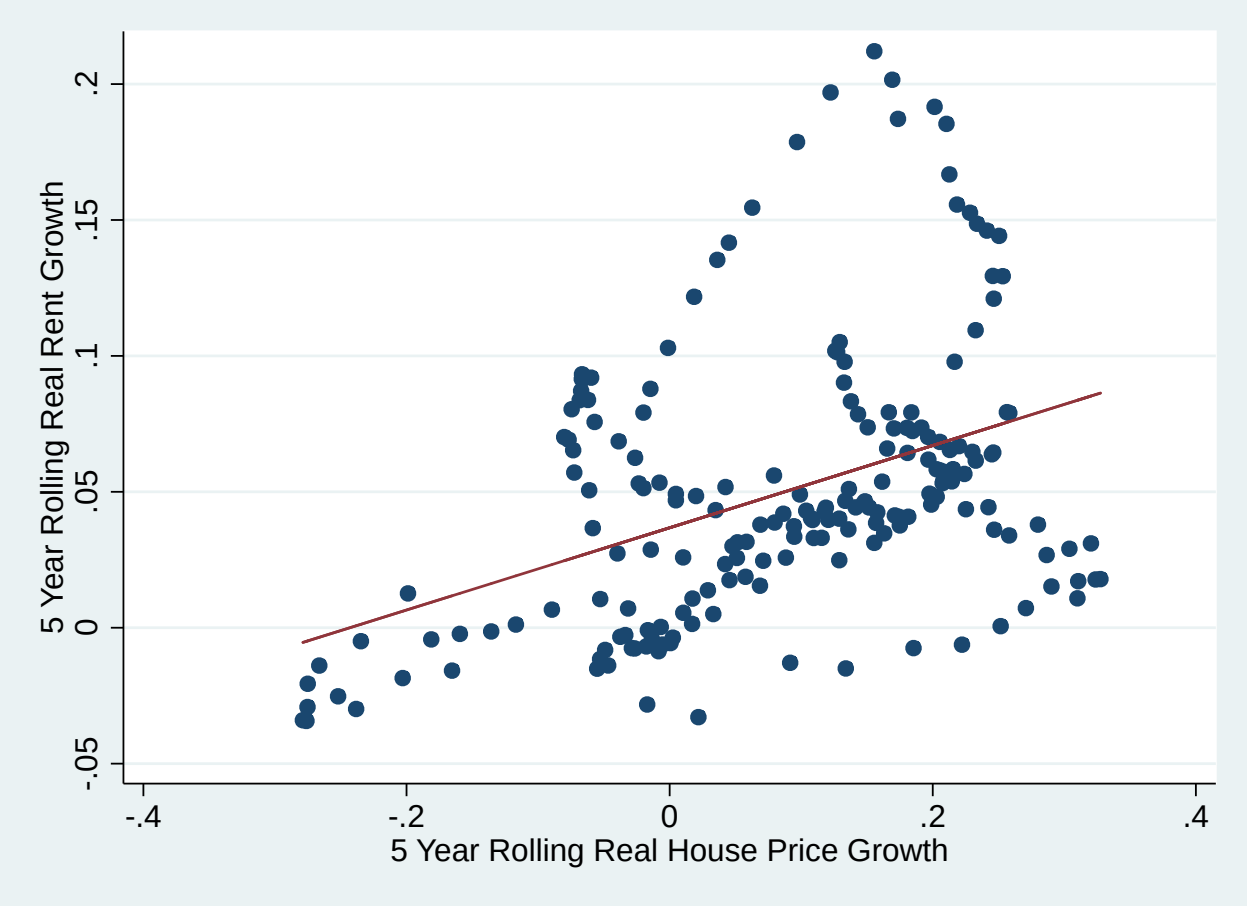

Figure A.I: Elasticity of Rents to House Prices - Evidence from the United States
The data on average house prices and rents come from Davis et al. (2008); it is available from http://www.lincolninst.edu/resources/. CPI data are from the BLS. Every quarter between 1965:1 and 2013:1, we calculate the cumulative growth, over the past 20 quarters, of house prices and rents, net of CPI growth (inflation). We then report these data on the above scatter plot, where each plot represents one quarter between 1965:1 and 2013:1. The red line corresponds to the fitted linear regression of long-term rent growth on house price growth. The estimated long-term elasticity of rents to prices is 0.15. The Newey-West t-stat is 2.12 (p-value = 0.036).

Table A.I: Comparison between Homeowners and Renters in the Intensive-Margin Sample

	Renters	**Owners**	**T-Test**
Panel A: Firm characteristics (1999 book values, in thousand Euros)			
Log(Asset)	3.85	3.63	7***
Log(Sales)	4.46	4.12	11.14***
Log(Debt)	3.55	3.15	11.48***
Log(1+# Employees)	0.69	0.42	15.13***
Log(Value Added)	4.04	3.74	10.26***
Log(Total Wage)	2.80	2.25	13.63***
Panel B: Entrepreneur characteristics			
Sole Proprietor	0.38	0.59	19.36***
Business at Home	0.26	0.77	50.87***
Age	36.82	39.17	11.02***
Gender (Male==1)	0.76	0.81	5.35***
Education			
No Diploma	0.17	0.21	3.93***
Vocational Training	0.38	0.47	8.3***
High School Diploma	0.20	0.15	5.83***
College Diploma	0.25	0.18	7.93***
Prior occupation			
Employed	0.53	0.54	.25
Unemployed	0.36	0.37	.87
Out-of-Workforce	0.11	0.09	1.8*

Table A.II: Comparison between Homeowners and Renters in the Extensive-Margin Sample

	Renters	**Owners**	**T-Test**
Entrepreneurship	0.012	0.014	2.4**
log(wage)	8.496	8.966	40.23***
Unemployed	0.097	0.035	38.07***
Age	40.386	45.329	85.22***
Gender	1.225	1.094	54.76***
Foreigner	0.104	0.034	42.42***
College Degree	0.088	0.114	12.17***
Education			
Some College	0.084	0.093	4.4***
High School	0.097	0.109	5.6***
Technical	0.312	0.349	11.55***
No Diploma	0.418	0.335	25.15***

Table A.III: Effect of 1992-1997 House Price Growth on Several Outcome Variables of Homeowner Entrepreneurs: Robustness to Exclusion of Paris

The table reports the coefficient of regressions of several outcome variables, measured in 1999 (first entire fiscal year after creation), on the interaction of regional home price appreciation from 1992 to 1997 (Δp) and a dummy for individual home ownership (Owner). We control for characteristics of the business owner (occupation previous to becoming an entrepreneur, age, education, gender), legal form of the business (sole proprietorship or corporation), industry, whether the firm is located in the owner's home or elsewhere, département fixed effects, as well as all interactions of the controls with Δp. We exclude from the regression businesses located in the Paris area. Standard errors are clustered at the regional level. *, **, and *** mean statistically different from zero at 10%, 5%, and 1% levels of significance.

	log(Assets)	log(Sales)	log(Debt)	log(1+#Employees)	log(Value Added)	log(Wage Bill)
	(1)	(2)	(3)	(4)	(5)	(6)
Owner × Δp	1.5***	1.1***	1.6***	.31***	1***	1
	(3.5)	(3.7)	(3)	(3)	(2.9)	(1.4)
Owner	.18***	-.18***	-.0066	-.11***	-.19***	-.38***
	(4.3)	(-4.4)	(-.12)	(-6.5)	(-4.2)	(-4.9)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls × Δp	Yes	Yes	Yes	Yes	Yes	Yes
Département-FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,798	8,798	8,798	8,798	8,798	8,798
Adj. R2	0.17	0.11	0.20	0.29	0.10	0.12

Table A.IV: Real Estate Capital Gains before Creation and Probability of Starting a Business

The table reports the estimates of linear probability model regressions of the decision to start up a company on the interaction of local house price appreciation in the five years prior to the decision (Δp) and a dummy for individual home ownership (Owner) as in Table V, column 3. The columns introduce controls one after the other. All regressions include region fixed effects and year fixed effects. T-statistics are in parentheses. Standard errors are clustered at the regional level. *, **, and *** mean statistically different from zero at 10%, 5%, and 1% levels of significance.

	Probability of Entrepreneurship						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Owner × Δp	.0095***	.0096***	.01***	.0091***	.0068***	.007***	.0065***
	(7.2)	(6.8)	(7.5)	(7.2)	(5.7)	(6.1)	(5.8)
Owner	.0012	.0007	.0061***	.0055***	.0057***	.0037***	.0039***
	(1.4)	(.95)	(7.5)	(7.4)	(7.8)	(5.7)	(6.1)
Δp	-.0083***	-.0062***	.09***	.14***	.12***	.12***	.12***
	(-5.2)	(-3.4)	(3)	(3.6)	(3.5)	(3.4)	(3.5)
College		.0095***	.018***	.018***	.018***	.018***	.019***
		(7)	(14)	(15)	(14)	(14)	(14)
College×Δp		.001	.0055	.0058	.0066*	.0061	.0055
		(.4)	(1.4)	(1.5)	(1.8)	(1.6)	(1.4)
Some college		.0045**	.01***	.01***	.01***	.011***	.012***
		(2.7)	(6.1)	(6.1)	(5.8)	(6.6)	(6.3)
Some college×Δp		-.0055**	-.0014	-.0012	.001	.0017	.00098
		(-2.3)	(-.57)	(-.52)	(.47)	(.81)	(.42)
High school		.0065***	.011***	.011***	.011***	.011***	.012***
		(5.2)	(9.2)	(9.2)	(9.1)	(9.3)	(9.1)
High school ×Δp		-.012***	-.0068*	-.0067*	-.0054	-.0055	-.006
		(-3.4)	(-1.8)	(-1.8)	(-1.4)	(-1.5)	(-1.6)
Technical training		.00099	.0039***	.0037***	.0035***	.0032***	.0035***
		(1)	(4)	(3.8)	(3.9)	(3.6)	(4.2)
Technical training×Δp		-.0016	-.0025	-.0035**	-.0018	-.0019	-.0026
		(-.91)	(-1.7)	(-2.2)	(-1.1)	(-1.2)	(-1.6)
Log(wage) or Log(UI) (t-1)			-.011***	-.013***	-.013***	-.013***	-.013***
			(-18)	(-17)	(-17)	(-18)	(-18)
Log(wage) × Δp			-.011***	-.016***	-.016***	-.016***	-.016***
			(-3)	(-3.5)	(-3.5)	(-3.5)	(-3.5)
Unemployed (t-1)				-.02***	-.02***	-.02***	-.02***
				(-4.6)	(-4.6)	(-4.6)	(-4.6)
Unemployed (t-1) ×Δp				-.095***	-.095***	-.096***	-.095***
				(-6.1)	(-6.1)	(-6)	(-6)
Age					-.000037	.000021	.000016
					(-.52)	(.3)	(.24)
Age × Δp					.00045***	.00044***	.00045***
					(3.6)	(3.6)	(3.7)
Female						-.014***	-.014***
						(-12)	(-12)
Female ×Δp						-.0017*	-.002**
						(-2)	(-2.3)
Foreigner							.0031
							(1.1)
Foreigner ×Δp							-.0052**
							(-2.5)
Constant	.019***	.017***	.11***	.12***	.13***	.13***	.13***
	(9.6)	(8.9)	(20)	(20)	(19)	(19)	(18)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table A.V: House Price Appreciation before Creation and Entry into Entrepreneurship

The table reports the estimates of regressions of the decision to start up a company on the local house price appreciation in the five years prior to the decision (Δp), without interacting with the ownership dummy. Columns (1) and (2) present estimates from probit regressions. Columns (3) and (4) are linear probability models. In columns (1) and (3), we control for region fixed effects and year fixed effects. In columns (2) and (4), we add controls for individual characteristics (education, previous salary, age, sex, whether the entrepreneur is a foreign national). T-statistics are in parentheses. Standard errors are clustered at the regional level. *, **, and *** mean statistically different from zero at 10%, 5%, and 1% levels of significance.

	Probability of Entrepreneurship			
	(1)	(2)	(3)	(4)
Δp	-.11***	-.068*	-.004***	-.0027*
	(-3.1)	(-1.7)	(-2.9)	(-1.9)
Region FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Observations	87,104	87,104	87,104	87,104