Housing Collateral and Entrepreneurship

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Abstract

This paper shows that collateral constraints restrict entrepreneurial activity. Our empirical strategy uses cross-sectional variation in local house price appreciation as shocks to the value of collateral available to homeowners, and controls for local demand shocks by comparing owners' entrepreneurial activity to that of 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 start larger firms, use more debt and create more value added, even in the long run.

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1 Introduction

This paper provides evidence that entrepreneurs face credit constraints, which restrict firm creation and post-entry growth, 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 example, individuals who experience a wealth increase, e.g., through inheritance, may also experience an expansion of business opportunities for reasons unrelated to their wealth (Hurst and Lusardi, 2004). This debate on whether financing constraints significantly hinder firm creation and growth carries important policy implications: many public programs, such as the 7a loan program from the Small Business Administration, subsidize small business financing based on the premise that young firms are in fact financially constrained.

To contribute to this debate, we use variations in house prices across French regions, combined with administrative, micro-level data on individual home ownership and accounting statements of newly-founded firms.[1] Our methodology follows Chaney et al. (2012) and is akin to a difference-in-difference strategy. We compare entrepreneurial outcomes of individuals owning a house and individuals renting a house within the same region, and then relate this difference to the house price dynamics observed across the 25 regions of our sample. Underlying our identification strategy is the idea that, when house prices rise, homeowners experience an increase in the value of the collateral available to start a business. In this context, renters serve as a useful benchmark because they face the same investment opportunities and demand shocks as homeowners. Thus, the within-region comparison of entrepreneurial outcomes by homeowners and renters allows us to difference out local economic shocks that may drive house prices and the creation and growth of local businesses.

As outcome variables, we consider both the extensive margin (i.e., entry decisions) and the in-

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

tensive margin (i.e., post-entry growth and survival, conditional on entry) of entrepreneurship. To quantify how shocks to the value of collateral available to households affect households' propensity to start a business, we use the French labor force survey, which is a rotating panel that tracks randomly selected households for three consecutive years and contains information on home ownership, location, and occupational choice. 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. The effect we report is economically sizable. Going from the 25th to the 75th percentile of the distribution of past house price growth increases the probability of firm creation by homeowners, relative to renters, by 11% in the most saturated specification. We find that this effect is larger for poorer homeowners, whose debt capacity is more likely to depend on collateral value. This finding is in stark contrast with Hurst and Lusardi (2004), who find that any effect of wealth on entrepreneurship is only present at the very top of the wealth distribution. We also find that this effect is larger for homeowners with larger houses, for whom a given growth in house prices leads to a larger increase in collateral value.

As a further test of the collateral channel hypothesis, we split the group of homeowners into full and partial owners. Partial owners are homeowners who still have a mortgage outstanding on their house. By contrast, full owners own their houses outright. As we explain in Section 2, only full owners can pledge their house as collateral to obtain a business loan. The reason is that it is very costly for partial owners to extract capital gains from their house, as home equity withdrawals and second lien loans are very rare in France (IMF (2008)). Our empirical analysis shows that our main effect is in fact entirely driven by full owners. Relative to renters, partial owners are not significantly more likely to start a business when house prices grow. In contrast, for full owners, a 1 inter-quartile range increase in past house price growth lead to a significant 28% increase in the probability to start a new business, relative to renters. Given that the wealth shock experienced by both partial and full owners is the same, this finding makes if unlikely that the effects we measure are solely driven by a decrease in risk aversion or an increase in the preference for being "one's own boss" that would result from the positive wealth shock induced by the increase in house prices

(Hurst and Lusardi (2004)). The collateral channel interpretation is also supported by the finding in the existing literature that wealth changes do not seem to affect risk aversion and risk taking significantly (Brunnermeier and Nagel, 2008). This test also allows us to assuage the concern that the exposure of renters to house price growth drives our main results. Renters and partial owners have opposite exposure to house prices, yet, both categories react in a similar way (i.e. not at all) to changes in past house prices.

We also investigate whether conditional on entry, collateral values affect size at creation, post-entry growth and survival. To this end, we use a detailed survey on a large cross-section of French entrepreneurs that registered a business in 1998. We merge this dataset with firm-level accounting data from tax files for up to eight years following the creation of the new firm. We find that in regions with larger house price growth in the early 1990s, firms started by homeowners in 1998 are significantly larger than firms started by renters. These "treated" firms also use more debt and create more value added.[2] These effects are robust to controlling for a large set of individual characteristics. More importantly, they are also persistent: firms started by entrepreneurs with lower collateral values in 1998 remain significantly smaller in terms of assets, sales, employment until our last year of data (2006). Finally, these effects are 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 13% larger in terms of total assets. Consistent with the collateral channel hypothesis, we show that these effects are more pronounced for entrepreneurs starting businesses in industries where credit constraints at creation are more prevalent.

In the last section of the paper, we investigate the importance of the collateral channel for firm creation in the aggregate. We find that total firm creation at the regional level is in fact more correlated with house prices in regions where the fraction of homeowners is larger. This result is important, as it confirms that the *net* effect of house price shocks on entrepreneurship across homeowners and renters is positive at the region level.

This paper contributes to the literature on financing constraints and entrepreneurship. The ex-

[2]We also find that total factor productivity is not smaller. Labor productivity is higher.

tant literature focuses on the link between entrepreneurial wealth and either firm creation, growth, or survival. Hurst and Lusardi (2004) and Adelino et al. (2013) are closest to our paper. We make two contributions that complement 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, thus improving identification[3], 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.[4] By contrast, using Danish data, Andersen and Nielsen (2012) find that businesses started following a large inheritance have lower performance. This finding suggests the relationship between wealth and entrepreneurship could be at least partially driven by private benefits of control, or in other words, that business ownership has a luxury-good component (Hurst and Lusardi, 2004; Kerr and Nanda, 2009). The relation between wealth shocks and post-entry growth/survival thus remains an open discussion. Our paper contributes to this debate by investigating the effect of wealth shocks generated by local variations in house prices for homeowners. Arguably, these shocks are less likely to be correlated with unobserved individual-level heterogeneity than inheritance shocks. Fracassi et al. (2012) finally 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 the effect of collateral value.

[3]By mechanically controlling for local economic conditions, our econometric approach avoids the problem of having to define and measure appropriate controls for economic conditions as faced by Fairlie and Krashinsky (2012).

[4]Similarly, Olds (2013) finds that the provision of public health insurance stifles entrepreneurship in the US. Hombert et al. (2013) find that a more generous unemployment insurance system for entrepreneurs leads to a massive increase in entrepreneurial activity in France.

Finally, our paper contributes to the 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. Benmelech et al. (2005) and Benmelech and Bergman (2008) have shown how the value and redeployability of collateral affects financial contracts. The application of their insight to our setting is that when house prices increase, firms and households have more valuable collateral to pledge, which raises borrowing capacity, and thus the demand for loans. 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, and their credit demand.

The paper has four remaining sections. Section 2 describes the French institutional setting. Section 3 explores how the extensive margin of entrepreneurship is affected by collateral values. Section 4 describes our analysis of the role of housing collateral on the intensive margin of entrepreneurship. Section 5 quantifies empirically the effect of the collateral channel on aggregate firm creation at the region level. Section 6 concludes.

2 The French Mortgage Market

The mortgage market in France is quite rudimentary. Among a set of 18 advanced economies, France ranks last on the Mortgage Market Index, an index that lies between 0 and 1 and that characterizes the level of development of national mortgage markets (IMF, 2008). The typical mortgage contract is a fixed-rate loan with a 15 to 20 year maturity, with a severe pre-payment penalty. While the average loan-to-value ratio is close to its US counterpart (75%), mortgage securitization is almost non-existent (less than 1% of residential loans outstanding). Importantly for our purpose, the French mortgage market allows for no or very little home equity withdrawal - second lien loans are a rarity (IMF, 2008). As a consequence, and in contrast to the US experience

(Kleiner, 2014), the collateral channel in France does not materialize through entrepreneurs funding their venture by taking on a second mortgage. Owners without an outstanding mortgage ("full" owners) can use their houses as collateral, but owners who still have to repay some debt ("partial" owner) cannot. Therefore, the collateral channel should only work for full owners in France. We will use this distinction in our tests.

In France, entrepreneurs often pledge their houses as collateral in order to obtain business loans, but this is also common practice in most other countries. Davydenko and Franks (2008) provide evidence that, in corporate bankruptcies, French banks are very likely to activate the entrepreneur's personal guarantee, and that this is a defining feature of the French environment when compared to the British or the German one (Table VI, Panel A of their paper). They report that, in France, personal or firm guarantees account for 44% of exposure at default in French bankruptcies, versus 13% for the UK and Germany. Personal guarantees are, however, also prevalent in Italy and the US. Using a sample of 343,300 loans from the Italian central credit register from 2004 Q2 to 2007 Q4. Rodano et al. (2012) report that 55% of Italian loans use personal guarantees as collateral. The most frequent source of personal guarantees is of course real estate, e.g., the entrepreneur's house. Similarly, Meisenzahl (2014) documents the pervasiveness of private residence as entrepreneurial collateral in the US. Using the US Survey for Small Business Finances, he reports that 52% of firms had to pledge collateral to receive a loan, 54% had to give personal guarantees, and 30% provide both; about 29% of the firms use the entrepreneur's private residence as a source of collateral. 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.

Finally, the collateral channel has the potential to be quantitatively important in France, even if it goes through house pledging. This is because "full" ownership is widespread in France. While the homeownership rate is similar to the US (57%), an important difference between France and the US is that 65% of French homeowners own their house entirely as opposed to only 32% in the US (Census Bureau N963 Mortgage Characteristics & Owner Occupied Units, 2007).

3 Housing Collateral and the Decision to Start a New Business

3.1 Data

To analyze the effect of variations in the value of housing collateral on the decision to start a new business, we use eleven consecutive yearly waves of the French Labor Force Survey (LFS) from 1992 to 2002 ("Enquête Emploi"). The French LFS is a three-year rotating panel, which is in many ways similar to the US PSID. The unit of observation is the home address. Each address is surveyed every year for three consecutive years, which allows to observe transitions from employment to entrepreneurship. The survey contains a rich set of characteristics about the respondent. Critical to our empirical design are variables on home ownership and geographic location.

Our dataset is constructed as follows. We restrict the sample to individuals who are surveyed for the second time, that is, individuals who are staying in the sample for one more year. We also restrict the sample to household heads. (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 exclude retirees and students from the sample, as well as individuals under 20 or older than 64. Because we are studying the transition into entrepreneurship, we also drop respondents who are already entrepreneurs or self-employed. Table 1, panel B, presents summary statistics on individuals' characteristics. The sample has 73,390 observations, corresponding to about 6,600 unique household heads surveyed every year from 1992 to 2002. The observable characteristics we use in our analysis are: a dummy equal to 1 if the respondent owns her house; the log of hourly wage (or unemployment benefits if the respondent is currently unemployed); a dummy equal to 1 if the respondent is currently unemployed; age; gender; a dummy equal to 1 if the respondent is foreign; 5 education dummies corresponding to individuals with (1) no diploma (2) a technical diploma (3) a high school diploma (4) a partial college degree (5) a college degree; 18 dummies for the respondent's father's job description corresponding to

categories such as school teacher, technicians, driver, ... 58% of individuals in the sample own their house and 7% are unemployed.[5] The median respondent is 43 years old. 13% of respondents are women and 7% are foreigners. Finally, 38% of the respondents have no diploma, whereas 8% have a college degree. The outcome variable we consider in this section is a dummy equal to 1 if the household head starts a business in the following year, which corresponds to year 3 in the survey for this individual. The average probability of transition into entrepreneurship is 1.4%.

Table 2 compares homeowners and renters on these observable dimensions. Relative to renters, homeowners earn higher wage (by about 60%), are less likely to be unemployed (by about 6.4 percentage points), are older (by about 5 years), are more likely to be male (by 12 percentage points) and less likely to be a foreigner (by 7 percentage points). These differences are economically large and statistically significant. Our empirical strategy controls for this heterogeneity among homeowners and renters. We also see from Table 2 that homeowners are slightly more likely to start a new firm (by .2 percentage points)

We merge this dataset with information on regional house prices in France. We construct a sample of yearly house price growth for 25 regions in France for the 1985-2005 period from two separate sources of information. We start with a dataset available from the French Ministry of Housing, which provides the average transaction value of houses from 1985 to 2002 for 21 regions in France.[6] This dataset is based on a representative sample of housing transactions and is collected from tax files. We combine this dataset with a repeat-sale house price index, which is available from the office of Parisian Notaries for the 1992-2002 period and covers 5 sub-regions within the larger region containing Paris. We then calculate, each year t and for each of these 25 regions, the cumulative growth of house prices between year $t-6$ and year $t-1$. Table 1, panel A, reports summary statistics for cumulative house price growth across regions. The median five-year regional house price growth in our sample period (1992-2002) is 14%. Crucially for our design,

[5] 7% is below the average unemployment rate for France over this period. This is because we are restricting the sample to household heads.

[6] These regions (*région*) correspond to administrative regions in France. The median region has a population of 1.8 Million. In terms of relative size, a French region is smaller than a US state but larger than a US county.

there is substantial heterogeneity across regions: the standard deviation of the five-year house price growth is 20%; the 10^{th} percentile of the five-year house price growth distribution is -3%, while the 90^{th} percentile is 31%. Panel A also reports the distribution of the growth of unemployment in percentage points across regions. The mean unemployment growth was .29 percentage points.

3.2 Empirical Strategy

3.2.1 Specification

The sample constructed in Section 3.1 consists of repeated cross-sections of unique non-business owners who may transition into self-employment from year t to year $t+1$. Let i be a non-business owner in year t, j a region and t the year where the individual is surveyed. Our estimating equation is:

$$\begin{aligned} E_{i,j,t+1} = \quad & \alpha + \beta \cdot \text{Owner}_{i,t} \times \Delta p_j^{t-6 \to t-1} + \theta \cdot \text{Owner}_{i,t} \\ & + \gamma \cdot Z_{i,t} + \tau \cdot Z_{i,t} \times \Delta p_j^{t-6 \to t-1} + \delta_l + \delta_{jt} + \varepsilon_{i,j,t}, \end{aligned} \tag{1}$$

where $E_{i,j,t+1}$ is a dummy variable equal to 1 if individual i living in region j and surveyed in year t becomes self-employed at date $t+1$. $\text{Owner}_{i,t}$ is a dummy equal to 1 if the individual owns her house in year $t-1$, the first year in which she is surveyed. $\Delta p_{j,t-6 \to t-1}$ is the cumulative house price growth in region j between year $t-6$ and year $t-1$. $Z_{i,t}$ are the control variables introduced in Section 3.1: four education dummies, gender, foreign dummy, past-year wage (or unemployment insurance benefit if unemployed), a dummy for past-year employment status (employed vs. unemployed), industry of occupation in year $t+1$, age and father's job description (14 items). Notice that we also control for the interaction of house price increases and personal characteristics, which alleviates the concern that heterogeneity across homeowners and renters is responsible for our results. δ_l are département fixed effects, where a département is a geographic sub-division of a region.[7] δ_{jt} are region-by-year fixed effects and are included to capture time-variation in local

[7] There are 90 départements in France. The median département has a population of about 600,000 people. In

investment opportunities. Note that these fixed effects not only absorb house price increases, but also all unobserved variables within a region in which our owners and renters live.

3.2.2 Identification

β is the coefficient of interest in equation (1). β is similar to a difference-in-difference estimator. The "treatment" group is the set of individuals in the Labor Force Survey that owns their house, while the "control" group consists of renters in the Labor Force Survey. The "treatment" in our setting is the 5-year cumulative house price growth in the region. A rise in house prices increases the collateral value available to homeowners, while it leaves' renters debt capacity largely unaffected. However, owners face the same local shocks to economic activity (demand shocks, investment opportunity shocks, ...) as renters, so that renter's self-employment decisions serve as a useful benchmark for the effect of local economic activity on entrepreneurship.

Thus, our identification strategy uses two sources of variations in the data to identify β: (1) in the cross-section of regions, in a given year, some regions experience larger house price growth than others, so that β is identified by comparing the difference in entrepreneurial activity between homeowners and renters across these regions with different house price growth (2) within a given region, house price growth will vary in the time-series, so that β will be identified also by comparing, within each region, how the difference in entrepreneurial activity between homeowners and renters varies as house price growth evolves. A positive β coefficient indicates that, in regions with high house price growth, homeowners are more likely than renters to register a new business, relative to regions with smaller house price growth. The null hypothesis that collateral values are irrelevant for entrepreneurial activity corresponds to expecting that $\beta = 0$.

This comparison between renters and homeowners is one of the key differences between our approach and the traditional approach in the literature (Hurst and Lusardi, 2004; Adelino et al., 2013), and weakens the assumptions needed for a causal interpretation of the correlations we find. Let us examine this reasoning step by step. First, if we were to run the regression (1)

terms of relative size, a département should be thought of as a US MSA.

without controls, our approach would rely on the identifying assumption that the elasticity of self-employment to local house prices differs between homeowners and renters only through the effect of house price growth on housing collateral value. This assumption would be quite strong. We have seen in Table 2 that homeowners and renters differ significantly in observable dimensions. One might hypothesize that these observable characteristics are correlated with the sensitivity of self-employment decisions to local house price growth. For instance, older individuals could be more likely to own a house *and* to start businesses in industries that have greater exposure to local economic activity, for example, in retail. In this case, failing to control for age, and the interaction of age with house price growth would lead to an upward-bias in the estimate of β.

We address this concern in several ways. First, we include a large set of control variables, as well as their interaction with house price growth ($Z_{i,t}$ and $Z_{i,t} \times \Delta p_j^{t-6 \to t-1}$ in equation (1)), rendering our approach similar to a "conditional difference-in-differences." These control variables, described in Section 3.2.1, seem to be correlated with the own-versus-rent decision. These interaction terms ensure that the estimation of β is not the result of homeowners and renters differing systematically on observable dimensions, which are themselves correlated with the elasticity of self-employment to house price growth. Second, we augment equation (1) to include the interaction of the homeownership dummy and a proxy for local economic activity, namely, the change in the département-level unemployment rate from $t-6$ to $t-1$. Finally, as we detail in Section 3.4, we exploit various dimensions of cross-sectional heterogeneity in the estimated effect to show that our results are likely driven by the collateral channel and not some other omitted factor. It is important to stress, however, that, as in Chaney et al. (2012), we ultimately do not have an instrument for the home ownership status of these individuals. This is the main limitation of this analysis.

Another concern with our empirical strategy is that renters are not a valid "control" group since they are themselves affected by the treatment, i.e. an increase in local house prices. We see two reasons why renters could be affected by increases in house prices. The first one is simply that as local house prices increase, rents increase as well, the renter has less disposable income,

which potentially impairs his ability to start a company. This channel is unlikely to play a large role in our setting because rents do not respond much to house prices, in part because they are strictly regulated. Since 1986, rents can only be freely set at the signing of a lease. Once a lease is signed, rents cannot increase by more than a reference index.[8] As a result, the rental price index is uncorrelated, in aggregate, with house prices. A time-series regression of quarterly growth in the national price index on quarterly growth in the rental price index yields an insignificant coefficient of .027.[9]

The second reason why renters may not constitute a valid "control" group is that an increase in house prices may lead renters to increase their savings in order to buy a house in the future – decreasing the resources available to invest in the firm. We address this concern in two ways. First, Campbell and Cocco (2007), in UK household data, investigate this question and find that renters do *not* increase their savings as a response to an increase in house prices. Second, we will show below that renters do not behave differently than partial homeowners, a piece of evidence inconsistent with this potential story. Assume house prices reduce renters' abilities to start a business. Partial owners, on the contrary, should be immune to this problem: Their debt repayments are insensitive to house prices and will eventually get full ownership. So under this interpretation, partial owners should be more likely to start businesses than renters when house prices grow. We do not, however, find any evidence of this in the data.

3.3 Main Results

The estimation of equation (1) is presented on Table 3. The estimation is done using OLS. The standard errors are clustered at the region-by-home-ownership level. With 25 regions, this results in 50 clusters. Given the analogy to a difference-in-difference estimator, clustering at the region by home ownership level is akin to clustering at the level of the unit of treatment, which is standard in quasi-experimental settings (Bertrand et al., 2004).

[8] Until 2006, this index was the construction cost and is now called the "Indice de Réference des Loyers". It is set by the French Statistical Office and basically mimics the consumer price index.

[9] Both series are available from the website of the statiscal office since 1996. We show these series in Figure B.1.

All regressions include département and region-by-year fixed effects. To evaluate the effect of observables on the estimation of β, we add control variables and their interaction with house price growth (Δp) progressively: 4 dummies for education (column (2)); previous year salary or UI benefit if eligible (column (3)); age (column (4)); gender and nationality (column (5)); current industry of occupation (column (6)); father's job description (column (7)). As we mention in Section 3.2.2, we add in column (8) the interaction of the home ownership dummy with changes in the unemployment rate from $t-6$ to $t-1$, measured at the département level, i.e. a finer geographic division than the region. This additional control is potentially important as it ensures that our effect is not simply driven by homeowners reacting differently to local investment opportunities/demand shocks, at least to the extent that the unemployment rate captures the local shocks to economic activity.[10]

The estimates of β reported in Table 3 are positive and statistically significant at the 1% confidence level across all specifications. These point estimates are also very stable across specifications. The point estimate of 0.014*** drops slightly going from column (3) to column (4), to about 0.01***, when we control for age and age interacted with Δp. The reason is that, as is well known, age is one of the main determinants of home ownership; at the same time, in our sample, older individuals tend to be more likely to start businesses in locations that have recently experienced a rise in house prices. Apart from age, the inclusion of the other control variables has no influence on the estimated β. Yet, these variables are relevant for the decision to become self-employed as witnessed by the increase in adjusted R^2s (from 0 in column (1) to .07 in column (8)). The fact that controlling for relevant observables that are correlated with homeownership (see Table 2) has little effect on the point estimate of β is comforting about the robustness of our result. We can also follow the insight of Bellows and Miguel (2009) and Altonji et al. (2005), and formalize this result. Let $\beta^{(8)}$ be the estimated β using the full set of control variables in column (7) and $\beta^{(1)}$ the estimated β using no control but département and region-by-year fixed

[10]We do not use region-level GDP growth as a control in this specification as the variable is available only from 1995 onwards and its inclusion thus leads to a large decrease in sample size. We use regional GDP growth as a control in our analysis of the intensive margin below.

effects. Bellows and Miguel (2009) show that the ratio $r = \frac{\beta^{(8)}}{\left(\beta^{(1)}-\beta^{(8)}\right)}$ measures how much stronger selection on unobservables, relative to selection on observables, must be to explain away the full estimated effect.[11] In our case, r is 2.41: to attribute the entire OLS estimate to selection into homeownership based on unobservables, selection on unobservables would have to be 2.4 times greater than selection on observables. We conclude that it is quite unlikely that our estimated effect is entirely driven by selection into homeownership based on unobservables.

Quantitatively, the effects we report in Table 3 are of a sizable magnitude. Using the point estimates from column (8), we find that going from the 25^{th} to the 75^{th} percentile of house price growth (a 16-percentage-point increase) leads to a .15-percentage-point (.0094$\times$ .16) increase in the probability of starting up a business. Because the unconditional probability of starting a business is 1.4%, the estimate corresponds to an 11% increase in the probability of becoming an entrepreneur.

We finish this section by emphasizing the importance of controlling for the homeownership status of the individual, which is one of the key novelties of this paper. In a seminal contribution, Hurst and Lusardi (2004) use PSID data to regress the probability of starting a business on past house price appreciation, without interacting the price appreciation with individual or average ownership rates. They 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 Appendix Table A.1, we report 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

[11] The intuition for this ratio is that the smaller the difference between $\beta^{(1)}$ and $\beta^{(8)}$, the less the estimate is affected by selection on observables, and the stronger selection on unobservables needs to be (relative to observables) to explain away the entire effect. The larger $\beta^{(8)}$, the greater is the effect that needs to be explained away by selection on unobservables, and therefore the higher is the ratio r. The formal derivation of this result is in the online appendix of Bellows and Miguel (2009).

results significantly, at least in our sample.

3.4 Comparative Statics

Our main empirical strategy controls for observable determinants of home ownership to address the potential endogeneity of the homeownership decision. In this section, we provide additional evidence consistent with the collateral channel interpretation that rules out further endogeneity concerns and alternative interpretations of the evidence. The approach presented here can be interpreted similar to a triple-difference analysis.

The first dimension we explore is the comparison between "partial" and "full" owners (owners with and without a mortgage outstanding on their home). As we explained in Section 2, there are no contracts allowing home equity extraction in France. So unless homeowners have no outstanding mortgage, they cannot pledge their house to a second lien lender. Therefore, given the organization of the French mortgage market, the collateral channel should only go through full owners. Aside from testing our hypothesis in the specific institutional context of our study, this test also allows us to investigate whether the link between housing wealth and entrepreneurship represents a pure "wealth effect". For instance, an increase in wealth may reduce risk aversion, or may increase the willingness to be one's own boss. The comparison between partial and full owners allows to distinguish the wealth effect from the collateral channel, as a given increase in house prices only increases the collateral available to full owners, while it increases the wealth of both categories of owners.

The Labor Force Survey contains a dummy variable equal to 1 if there is an outstanding mortgage on the house. We use this information to construct two separate groups: partial and full homeowners. We then simply estimate equation (1) using these two groups as two separate "treatment" groups, while keeping renters as our control group. We obtain two separate estimates for β, $\beta^{\text{partial owners}}$ and $\beta^{\text{full owners}}$. The group of partial homeowners can be thought of as a "placebo" treatment group. If our results are driven by homeowners having unobserved characteristics that also correlate with the elasticity of self-employment to house prices, we would expect $\beta^{\text{partial owners}}$

to be positive and significant. Similarly, if our results are driven by a wealth effect alone, given that partial owners' wealth increases relative to renters when house prices increase, we would also expect $\beta^{\text{partial owners}}$ to be positive and significant. By contrast, if our results are due to collateral constraints, only $\beta^{\text{full owners}}$ should be positive and significant.

The results are reported in Table 4. Note first that among the 42,549 homeowners in the sample, 40% are full owners.[12] Column (1), (2) and (3) estimates equation (1) restricting the sample to renters and owners with an outstanding mortage on their house as a treatment group. Column (4), (5) and (6) restrict the sample to renters and full owners. Column (1) and (4) include only département and region-by-year fixed effects. Column (2) and (5) add all the observables from column (7) of Table 3. Column (3) and (6) include changes in the département-level unemployment rate from $t-6$ to $t-1$, as well as its interaction with the homeownership dummy. The results across these specifications show unambiguously that an increase in house prices leads to more entry only for full owners, but not for owners with an outstanding mortgage. We find that, when including the whole set of control variables, $\beta^{\text{partial owners}}$ is equal to an insignificant -.0016 and that this zero estimate is fairly precisely estimated, with a standard error of .0025. On the other hand, $\beta^{\text{full owners}}$ is a significant .025***. This effect is more than two times larger than the one estimated using all the owners as our "treatment" group. Going from the 25^{th} to the 75^{th} percentile of house price growth (a 16-percentage-point increase) leads to a .4-percentage-point (.025$\times$.16) increase in the probability of starting up a business, which is an 28% increase in the probability of becoming an entrepreneur. Given that, following an increase in house prices, partial owners experience, relative to renters, an increase in their wealth, the results in Table 4 are not consistent with a wealth effect driving our main result in Table 3. Because full owners are homeowners, these results also invalidate the idea that, on average, homeowners are simply individuals whose investment opportunities tend to react more to the local business cycle. At the same time, the results are very much consistent with a collateral effect.

[12]This proportion of full owners is lower than for the whole population (60%) because of our sample selection (individuals younger than 65, already employed, etc...).

The next comparative statics result that is consistent with a collateral channel interpretation is as follows. If our main results are driven by the collateral channel, we expect that for a given increase in local house prices, owners of larger houses will experience a larger increase in their collateral value, which will lead to relatively more business creation, compared to owners of smaller houses. In Table A.2, we split our sample based on the size of the house the household lives in. Column (1) to (3) estimate equation (1) on the sample of individuals living in houses with 3 rooms or less. Column (4) to (6) estimate equation (1) on the sample of individuals living in houses with 4 rooms or more. We see in Table A.2 that an increase in house prices leads to a significant increase in self-employment relative to renters mainly for those individuals leaving in larger houses: going from the 25^{th} to the 75^{th} percentile of house price growth lead to a significant 16% increase in the relative probability of self-employment for owners of larger houses, while it leads to an insignificant 2% increase in the relative probability of self-employment for owners of smaller houses.

The third and last dimension of cross-sectional heterogeneity we consider is household income. The premise of this analysis is that accessing the unsecured credit market is more difficult for poorer households. Thus, we expect the self-employment decisions of poorer households to be more affected by changes in collateral values than that of richer households. In Table A.3, we split our sample based on the household's income. Column (1) to (3) estimate equation (1) on the sample of individuals with below-median income, while column (4) to (6) use the sample of individual with above-median income. The effect of collateral values on entry decisions is about twice as large for individuals in the bottom-half of the income distribution. The point estimate for β in the most saturated specification is .023*** for individuals with income below the medan income and .0042* for individuals above the median income. Quantitatively, this means that for a 16 percentage point increase in house price growth from $t-6$ to $t-1$ (the inter-quartile range of house price growth in this sample) leads to a .36 percentage point increase in the probability to start a business for an individual in the bottom-half of the income distribution. For an individual in the top-half of the income distribution, this number is only .07 percentage points. In our

sample, individuals in the bottom half of the income distribution are twice more likely to start-up businesses unconditionally (1.8% vs. .95%). These effects can thus be quantified as a 20% increase in the probability to start a business for individuals in the bottom-half of the income distribution and a 7% increase only in the probability to start a business for individuals in the top-half of the income distribution.

These results contrast with Hurst and Lusardi (2004), who find that wealth gains matter only for the top 5% of the wealth distribution. We find that increases in collateral values are particularly effective at facilitating the transition to entrepreneurship of the lower parts of the income distribution. Besides the fact that we study a different country, we believe our approach of comparing owners and renters allows us to test the collateral channel more directly.

4 Housing Collateral and Entrepreneurial Outcomes

4.1 Data

To analyze the effect of collateral values on the intensive margin of entrepreneurship, we need to construct a sample of individuals who are already self-employed, obtain information on their location and homeownership status, and gain access to the accounting statements of the businesses they own. To do this, we start 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 randomly selected firms.[13] 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

[13]The survey uses stratified sampling, where the strata are the headquarter's region and the 2-digit industry of the firm.

the entrepreneur whether she owns or rents her private home.[14]

To measure post-entry growth, we use accounting information from tax files. These files, available yearly from the Finance Ministry for the 1999-2005 period, 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 with annual sales below 32,600 Euros (81,500 Euros in retail and wholesale trade). Such firms 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 then merge this matched sample with the dataset on house price growth described in Section 3.1. This sample contains cumulative house price growth for the 1992-1997 period for the 25 regions used in our analysis. This cumulative growth is our measure of housing capital gains for entrepreneurs who register their firm in 1998 and are homeowners. Figure 1 shows the evolution of house prices in our sample across these 25 regions from 1992 to 1997. Over the 1992 to 1997 period, the median region experienced a cumulative house price growth of about 2%. There is significant heterogeneity across régions, from a decline of about 3% at the 25^{th} percentile to an increase of about +8% at the 75^{th} percentile. Out of the 25 regions covered in the sample, nine experienced house price declines over that period. In particular, Paris and the surrounding regions experienced a severe decline of house prices by around 20% on average over this five year period.

The 1998 wave of the SINE survey contains 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

[14]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, in contrast to our analysis of the extensive margin in Section 3, which uses 11 repeated cross-sections.

have information on all the variables we include in our regression analysis: homeownership (our key explanatory variable) and other control variables. Specifically, we control for entrepreneurial characteristics (previous employment status (employed, unemployed, out of the labor force), age, education (no diploma, technical training, high school diploma, college diploma), gender, previous job description (craftsman, executive, intermediary profession, employee, worker), existence of an entrepreneurial background and a serial entrepreneur dummy), and firm characteristics (business form, whether the business is operated from the entrepreneur's home and industry (36 industry classification)). We end up with a sample of 9,125 firms.

Table 5 presents summary statistics of the intensive-margin dataset. Panel A reports the distribution of house price growth from 1992 to 1997 across the 25 geographic regions. Panel B reports the firm characteristics we use as controls in our regression analysis for 1999, the first whole fiscal year after creation. The average firm has 131k euros in assets, 209k euros in sales, 102k euros of debt, and close to two employees. Average value added (revenue less outside purchases of materials and services) is 131k euros, of which 50k 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, but a few firms grow large very quickly. Panel C describes the personal characteristics of the entrepreneurs in this large, representative sample of entrepreneurs, which is largely composed of small firms (as would be the case in U.S. data (Hurst and Pugsley, 2012)). Only 23% of the entrepreneurs in our sample have a college degree, and 41% have technical 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-four percent take the legal form of a sole proprietorship, a number similar to that reported by Levine and Rubinstein (2013). Overall, because of the large fraction of less educated, 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. Figure 2 reports the industry distribution of the firms in our sample. As expected in a representative sample of newly created firms, construction,

retail, hotels, restaurants and business services are the most common industries.

Table 6 compares homeowners and renters along these observable characteristics. As was the case in the Labor Force Survey (Table 2), we report some large and significant differences in observables. Consistent with binding wealth constraints, entrepreneurs who own their houses create smaller firms (about 25% smaller in terms of asset or employment). They are also less educated (4 percentage point more likely to have no diploma, 7 percentage point less likely to have a college diploma). Homeowners are also less likely to incorporate their firm (by 21 percentage points) and much more likely to work from home (by 50 percentage points). Relative to renters, entrepreneurs who own their houses are older and less likely to have already started a firm prior to their current entrepreneurial experience. There are no large differences in terms of prior occupation or previous job descriptions across homeowners and renters, except that owners are more frequently from a blue-collar background. Overall, Table 6 is not consistent with the notion that homeowners are richer, more educated, or have other characteristics suggesting that they are unconditionally more able to run a business. Importantly, our empirical strategy, which we describe below, will control for the observable heterogeneity among homeowners and renters.

4.2 Empirical Strategy

4.2.1 Specifications

To study the effect of collateral values on outcomes at creation, we estimate the following equation, where i is an entrepreneur/firm and j is the entrepreneur's region of location:

$$\begin{aligned} Y_{ij}^{1999} = \alpha + \phi \cdot \text{Owner}_i \times \Delta p_j^{1992 \to 1997} + \theta \cdot \text{Owner}_i \\ + \gamma \cdot Z_i + \tau \cdot Z_i \times \Delta p_j^{1992 \to 1997} + \delta_l + \delta_{\text{industry} \times \text{region}} + \varepsilon_{i,j}. \end{aligned} \tag{2}$$

The 1999 upper script denotes the fact that the outcome variable is measured in 1999, which is the first whole fiscal year after creation in 1998. The outcome variables we consider are the

logarithm of one plus total assets, total sales, number of employees, total debt, value added, and total wage bill. Owner is a dummy equal to 1 if the entrepreneur is a homeowner. $\Delta p_j^{1992\to1997}$ is real estate price growth in region j from 1992 to 1997. δ_l are département fixed effects, where a département is a geographic sub-division of a region. $\delta_{\text{industry}\times\text{region}}$ are industry-by-region fixed effects, meant to capture region-industry specific investment opportunities. The Z_is are control variables for the business owner or for the firm she creates, which are also interacted with past house price growth $\Delta p_j^{1992\to1997}$. These controls Z_i include: a dummy equal to 1 if the firm is a sole proprietorship; a dummy equal to 1 if the entrepreneur works from home; a dummy equal to 1 if someone in the entrepreneur's entourage is an entrepreneur; a dummy equal to 1 if the entrepreneur already started a firm before his or her current entrepreneurial experience; age; gender; 4 dummies for education (no diploma, technical training, high-school diploma, college diploma); 3 dummies for prior occupation (employed, unemployed, out of the labor force); 5 dummies for prior job description (craftsman, executive, intermediary profession, employee, worker); 34 dummies for industry.

Beyond size and other outcome at creation, increased collateral value may also affect outcomes in the medium run, e.g. several years after creation. For instance, this can be the case if the firm has to make some irreversible technology choice at creation or if there are significant adjustment costs to capital. To investigate this possibility, we estimate equation (2) but replace the outcome variables measured in 1999 with the same outcome variables measured in later years (up to 2005). This leads to the following equation:

$$\begin{aligned} Y_{ij}^t = \alpha + \phi_t \cdot \text{Owner}_i \times \Delta p_j^{1992\to1997} + \theta_t \cdot \text{Owner}_i \\ + \gamma_t \cdot Z_i + \tau_t \cdot Z_i \times \Delta p_j^{1992\to1997} + \delta_l + \delta_{\text{industry}\times\text{region}} + \varepsilon_{i,j}^t. \end{aligned} \tag{3}$$

An issue with this specification is that we only observe outcomes in later years for those firms that do not exit the sample. This may create a survivorship bias. Firms started by homeowners in regions that experienced large house price growth from 1992 to 1997 might be more likely to exit,

e.g., because they overborrowed. Had they remained, these firms would have been small, so that their attrition create an upward bias on the estimate of ϕ_t. We deal with this issue in two ways. First, we impute a value of 0 for the dependent variables of firms that exit the sample: exiting firms are thus considered to have 0 employees, 0 assets, etc... Second, we examine separately the role of financing constraints on survival, by using a failure hazard rate as a dependent variable in equation (2):

$$\begin{aligned}\mathbb{S}_{ij}^{t\to t+1} = \alpha + \psi_t \cdot \text{Owner}_i \times \Delta p_j^{1992\to 1997} + \theta_t \cdot \text{Owner}_i \\ + \gamma_t \cdot Z_i + \tau_t \cdot Z_i \times \Delta p_j^{1992\to 1997} + \delta_l + \delta_{\text{industry}\times\text{region}} + \varepsilon_{i,j}^t. \end{aligned} \quad (4)$$

where $\mathbb{S}_{ij}^{t\to t+1}$ is a dummy equal to 1 if firm i is in the sample in year t and exit the sample in year $t+1$ and 0 if the firm remains in the sample in t and $t+1$. We consider these failure hazard rates from $t = 1998$ to $t = 2003$. We also integrate these failure hazard rates by using the probability of failure before 2005 as a dependent variable.

All the estimations in this section are done using OLS and, as in Section 3, cluster standard errors at the region by home ownership level, which, in our difference-in-difference like setting is similar to clustering at the level of the unit of treatment.

4.2.2 Identification

As equation (1), equation (2) can be interpreted similar to a difference-in-difference strategy. The "treatment" group consist of entrepreneurs owning their home, while renters constitute the "control" group. The treatment is the various levels of house price growth that these entrepreneurs experience prior to registering their firm. The first difference can be thought of as a comparison of the size of new businesses created by homeowners in regions with high house price growth from 1992 to 1997 and the size of new businesses created by homeowners in regions with low house price growth from 1992 to 1997. Intuitively, if entrepreneurs need real estate collateral in order to access

external financing, homeowners should be able to create larger firms in regions that experienced large real estate inflation relative to regions with smaller house price appreciation. The second difference compares, within a given region, the size at creation of firms created by renters and firms created by homeowners. Renters serve as a natural benchmark in our setting: 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 ϕ coefficient— our coefficient of interest— in equation (2) 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 $\phi = 0$.

As in Section 3.2.2, if we were to run a regression without controls, the identification strategy would rely on the comparison of entrepreneurial outcomes of homeowners and renters across regions with different house price dynamics alone. The identifying assumption then would be that absent a collateral channel, the size of firms started by homeowners and renters would NOT systematically differ as a function of local house price growth. This is, of course, a strong assumption. Homeowners might exhibit specific characteristics (or create firms with specific characteristics) that may explain why the firm they create tend to be more sensitive to the local housing cycle. For instance, homeowners are older on average, and it could be that older entrepreneurs are more likely to start businesses in industries that have greater exposure to local economic activity, for example, in retail. If this is the case, then failing to control for age, and the interaction of age with the local growth in house prices would lead to an upward-bias in the estimate of ϕ: even in the absence of a collateral channel, ϕ would be positive. More generally, if the elasticity of size at creation to past house price appreciation depends on unobserved characteristics that are themselves correlated with homeownership, the identifying assumption is no longer valid.

We attempt to alleviate these concerns in three different ways. First, we control in equation (2) for a variety of personal/firm characteristics that might be correlated with the own-versus-rent decision (see Section 4.2.1 for a description of the controls Z_i). By interacting these variables

with our price growth variable in equation (2), we ensure our effect is not driven by composition effects arising from renters and homeowners differing significantly on these observable dimensions, as we know they do from Table 6. Second, we augment equation (2) to include the interaction of the homeownership dummy and two proxies for local economic activity: the change in the département-level unemployment rate from 1992 to 1997, and the growth rate of region-level GDP from 1992 to 1997. Finally, as we detail in Section 4.4, we exploit various dimensions of cross-sectional heterogeneity to show that our results are likely driven by the collateral channel and not some other omitted factor. It is important to stress again that, as in Chaney et al. (2012), we ultimately do not have an instrument for the home ownership status of these individuals.[15]

A last concern with our empirical strategy is that home ownership for the entrepreneurs in the SINE survey is measured in the year of business creation rather than at the beginning of the five year window for home price appreciation. Home ownership may change at the time of business startup, as the entrepreneur tries to free up capital for the business or to reduce other sources of risk in its household investment portfolio. This creates potentially measurement error, which in principle will bias ϕ toward 0.[16]

4.3 Main Results

4.3.1 Outcomes at creation

Table 7 reports the estimate of ϕ in equation (2). The outcome variables are the natural logarithm of one plus total assets (column (1)), sales (column (2)), number of employees (column (3)), debt (column (4)), value added (column (5)) and total wage bill (column (6)). The specification reported on Table 7 use the entire set of control variables introduced in Section 4.2.1. We do not report

[15] As in Section 3.2.2, one issue with our empirical strategy is that renters may also be affected by variations in house prices. We defer the reader to Section 3.2.2 for a discussion of why renters are unlikely to be affected, at the horizon we are looking at, by local variations in house prices.

[16] However, this measurement error could also generate an upward bias on the estimate of ϕ, if homeowners who tend to sell their house when house prices increase also tend to create smaller firms on average. In this case, there would be a category of "false" renters who create small firms in regions with high house price growth. This source of upward bias does not seem very credible.

these controls for brevity.

Table 7 shows significant effects of collateral values on the size of newly created businesses, conditional on entry. Going from the 25th to the 75th percentile of house price growth from 1992 to 1997 (i.e., a 11 percentage point increase in house price growth) leads to a 13% (=1.2 × .11) increase in total assets, a 10.3% (=.94 × .11) increase in total sales and a 4% (=.37× .11) 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 10.3% (=.94 × .11) increase in total debt.[17] These elasticities are quite large economically. The average house value at the time is around €175,000. A house prices increase of 11% over the past 5 years represent an increase of €19,250 in collateral value. This leads to an increase in total assets at creation of 1.2 × .11 = 13.2%. Given that the average size at creation in our sample is about €130k, this is an increase in asset at creation of about 130 × .0132 = €17.2k or about 90% of the increase in collateral value. This is a large but plausible elasticity.

We also investigate how this access to more valuable collateral affects value creation. To do so, we use total value added and the total wage bill paid by the newly created firms as dependent variables. The estimated effect on the total compensation of employees is large (9.7% increase following an 11-percentage-point increase in house price growth). Total value added created by homeowners, measured as sales minus intermediary inputs, is also significantly larger following larger house price appreciation in the five years preceding the firm's creation. An 11 percentage point increase in house prices leads to a 9.2% (=.88 × .11) increase in value added.[18] All the results in Table 7 are significant at the 1% confidence level, when standard errors are clustered at

[17] In unreported regressions, we use the leverage ratio as a dependent variable and estimate a positive, but insignificant ϕ. One interpretation is that firms use 100% leverage to finance their incremental assets and that, given the small size of the firms we are looking at, the corresponding increase in the leverage ratio is too low to be detectable in our sample.

[18] To further our understanding of the efficiency consequences of shocks to collateral values, we estimated equation (2) using measures of productivity as dependent variable. In unreported regressions, we find that the gap between the TFP of firms created by homeowners and renters does not significantly vary as a function of local house price growth prior to creation. In other words, firms started with larger debt capacity appear to be neither more nor less productive.

the region by ownership level.

Recall that Table 7, discussed above, shows the result of the estimation of equation (2) when all the controls Z are included in the regression. In Table A.4, we present the estimate of ϕ in equation (2) when we add the controls progressively into the analysis. We use the logarithm of one plus total assets (columns (1) to (4)) and total sales (columns (5) to (8)) as dependent variables. Column (1) and (5) have only département and region-by-industry fixed effects. Column (2) and (6) add controls for industry and legal status of the firm. Columns (3) and (7) add controls for education, previous job description and previous employment status. Columns (4) and (8) add controls for age, gender, entrepreneurial background and previous entrepreneurial activity. Table A.4 shows that adding these controls change only slightly the estimation of ϕ in equation (2), which hovers around 1*** for total asset and .8*** for total sales. At the same time, these controls increase the R^2 of these regressions: from 5% to 29% for log(Assets) and from 5% to 20% for log(Sales). As we already emphasized in Section 3.3, the stability of the point estimate of ϕ as we include additional, relevant control variables suggests that selection based on observables is of limited scope, and implies that selection on unobservables would have to be very large to explain away our results in Table 7. This result is particularly important in the context of equation (7) as there are two potential selection biases at play in the sample. As in Section 4, individuals may decide to become homeowners based on unobserved characteristics, which then explain why they start more cyclical businesses. Additionally, if access to more valuable collateral increases expected profit from entrepreneurship, the marginal homeowner-entrepreneur in a region with increasing house prices may have lower productivity than the marginal homeowner-entrepreneur in a region with lower house price growth. This would lead to a downward bias in ϕ. The results in Table A.4, which show that selection on observables characteristics has little effect on the estimated ϕ suggest that these selection concerns based on unobservable characteristics are unlikely to be driving entirely the effects we report on Table 7.

An important concern with the analysis so far is that past house price appreciation is also correlated with local investment opportunities and that homeowners and renters may react differently

to these opportunities, even after controlling for all the observable characteristics included in Z. To alleviate this concern, we use two variables to capture these local investment opportunities: (1) the region-level GDP growth from 1992 to 1997 and (2) the département-level change in the unemployment rate from 1992 to 1997. We include the interactions of these two variables with the homeownership dummy in equation (2). The results are reported on Table A.5. As can be seen from this table, the results are left almost unchanged relative to the main analysis of Table 7. Including the interaction of the home ownership dummy with past local GDP growth and past changes in local unemployment change the point estimate of ϕ from 1.2*** to 1.1*** for total assets, .94*** to .9*** for total sales and leave unchanged the point estimate for debt. All results remain statistically significant at the 1% confidence.

Another version of the previous concern is that there is momentum in house prices, so that areas experiencing high house price growth from 1992 to 1997 also have high house price growth in the late 90s / early 200s, and thus good investment opportunities for homeowners. To address this concern, we augment equation (2) by adding the interaction of the homeownership dummy with the realized house price growth from 1999 to 2004. The results are presented in Table A.6. Once again, the results are left almost unchanged relative to our main findings of Table 7. For instance, for total assets, ϕ remains equal to 1.2*** while for total debt, ϕ goes from .94*** to 1***. All results remain statistically significant at the 1% level.

As we mentioned in Section 4.1, Paris and the neighboring areas are large regions that experienced the largest house price decline from 1992 to 1997. To ensure that these particular regions are not driving our main results in Table 7, we re-estimate equation (2), but exclude Paris and its surrounding départements ("Petite Couronne") from the sample. The results are presented in Table A.7. The point estimates are again very close quantitatively to those obtained in Table 7. All results remain statistically significant at the 1% confidence level.

4.3.2 Long-run results

Our main finding so far have shown that financing frictions affect firms' outcomes at creation. This effect on size at creation has the potential to create significant effect on aggregate TFP and output (Midrigan and Xu, 2013). However, this effect can be largely mitigated after a few years, as firms accumulate enough profits to self-finance their growth. This is especially true if firms' productivity shocks are persistent (Moll, 2013). In this section, we directly address the empirical validity of these ideas by investigating potential long-run effects of financing shocks at creation. To this end, we estimate equation (3), which uses outcome variables measured up to 7 years after creation as dependent variable. This specification allows us to see whether firms started by homeowners following an increase in house prices are larger than firms started by renters, even several years after creation.

Table 8 reports point estimates for ϕ_t in equation (3) for the six outcome variables logarithm of one plus total assets, sales, number of employees, debt, value added, and wage bill. Figure 3 simply plots the ϕ_t coefficients and their associated 90% confidence intervals as a function of t for these six outcome variables. Our results can be summarized as follows. First, we find that all the coefficient estimates remain positive for all years. Second, except in 2002, most estimates are statistically significant at least at the 10% confidence level. In 2000, 2001, 2004 and 2005, all six estimates of ϕ_t are significant at the 5% confidence level. Third, except in 2002, the point estimates for ϕ_t are remarkably stable in time and close to their 1999 value. Consider column (1) of Table 8, which shows the ϕ_t estimates when the dependent variable is the log of 1 plus total assets. We see that the coefficients varies from 1*** in 2000 to 1.1*** in 2005, with a lowest value at .58 in 2002 and then .93** in 2003. The 2004 estimate of ϕ_t for total assets is even equal to its 1999 estimate shown in Table 7. In other words, the size differential between firms created by homeowners and firms created by renters across regions has a similar magnitude 5 years after these firms have been created. Using the 2005 estimates, we see that firms that started following an 11 percentage point increase in house prices from 1992 to 1997 are still 12% larger in 2005. The

stability of the ϕ_t coefficient is similar for most outcome variables. For instance, excluding 2002 — where all but one point estimates are smaller and insignificant — we find that the average ϕ_t coefficient estimated when debt is the dependent variable is equal to .85, which is close to its 1999 value of .94. In sum, Figure 3 and Table 8 show that collateral shocks have a persistent effect on the long-run behavior of newly created firms.

One potential issue with our long-run analysis is that subsequent movement in house prices may interfere with our results. If house price exhibit momentum at the 5 year horizon, firms started by homeowners following a rise in house prices from 1992 to 1997 would also experience a subsequent increase in collateral value from 2000 to 2005. This subsequent increase in collateral value could explain why these firms are able to remain larger than the other firms in the sample. If this were the case, the results from Table 8 could not be interpreted as the long-run effects of initial conditions and would be more in line with a contemporaneous collateral channel as in Chaney et al. (2012). We first address this issue by looking directly at house price dynamics in this sample. Figure 4 plots region-level house price growth from 2000 to 2005 against region-level house price growth from 1992 to 1997. House price growth from 1992 to 1997, which we use as our measure of collateral gains for owners in 1998, is negatively correlated with house price growth from 2000 to 2005. The slope of the relationship between house price growth from 1999 to 2004 and house price growth from 1992 to 1997 is -.6**, with an R^2 of 24%. Hence firms that we consider collateral rich at birth in 1998 experience lower house price growth after creation, which, if anything, should downward bias the effect of our main long-run analysis.

To address the concern more precisely, we augment equation (3) by including an interaction term for house price growth from 1999 to t interacted with the homeownership dummy (where t is the year where the outcome variable is measured). This additional control should capture the effect of post-creation variations in collateral values. The results from this estimation are presented in Table A.8, panel A, where we only look at log(Asset) as a dependent variable. The point estimate of ϕ_t for each year are of the same magnitude than what we find when we do not control for the realized price growth from 1999 to t. The point estimate on the interaction of house price growth

from 1999 to t and the home ownership dummy is insignificant and small in magnitude. Finally, panel B of Table A.8 estimates equation (3) on the sample of surviving firms only. We find that, even conditional on survival, there is still a significant long run effect of initial collateral values on subsequent firm outcome. The effect is, however, almost half the effect we find when we include the exiting firms in the analysis. In other words, it seems that firms with higher initial collateral values are, if anything, less likely to exit the sample, so that not accounting for the attrition of firms with lower initial collateral values lead to an under-estimation of the long-run effect of initial collateral value shocks. We explore this question of attrition in more detail in Section 4.3.3.

Overall, our analysis suggests that firms that are able to use higher collateral values to start on a larger scale remain significantly larger, even 7 years after creation. This could be consistent with models of early technology adoption (Midrigan and Xu, 2013) or with slower accumulation of internal funds for constrained firms (Moll, 2013).

4.3.3 Survival and initial collateral value

One possible interpretation of our results so far is that collateral shocks make homeowners less risk averse, because risk aversion is a decreasing function of wealth in some utility specifications. Besides the fact that wealth changes do not seem to be correlated with the holdings of risky assets (Brunnermeier and Nagel, 2008), we showed in the previous Section that the decision to enter is the same for full and partial owners. In the context of our intensive margin regressions, we can also test this hypothesis more directly. A consequence of the "reduced risk aversion" hypothesis is that firms started by wealthier homeowners should be riskier than firms started by relatively poorer individuals.[19]

As a first test of this risk-taking hypothesis, we estimate equation (4). Table A.9 shows the result from this estimation. Columns (1) to (6) look at instantaneous failure hazard rate from

[19] Another version of this hypothesis is that risk-aversion is negatively correlated with home ownership so that homeowners are prone to starting larger firms when local business conditions improve. The literature on home ownership is not decisive in terms of the correlation between home ownership and risk aversion. Sinai and Souleles (2005) argues that an important margin in the rent-vs.-buy decision is hedging, which would suggest that risk aversion is *negatively* correlated with home ownership.

year t to $t+1$, while columns (7) and (8) use the probability that the firm will exit the sample before 2005 as a dependent variable. The results show that higher collateral values at creation leads, if anything, to a *lower* probability of exit. We find that the effect of the interaction of house price growth from 1992 to 1997 and the home ownership dummy on instantaneous failure hazard rate is insignificant for all but one year (2003) and it is then negative — implying that larger collateral values at creation lead to a lower conditional failure hazard rate in 2003. Consistent with the results from columns (1) to (6), column (7) shows that the overall probability of exiting the sample before 2005 is negatively but insignificantly correlated with the interaction of house price growth from 1992 to 1997 and the home ownership dummy. In column 8, we additionally control for the interaction of the home ownership dummy and region-level GDP growth from 1992 to 1997 and départements level change in unemployment rate from 1992 to 1997. This makes the point estimate of ψ negative and statistically significant at the 5% confidence level. Taken together, these results from Table A.9 are inconsistent with the hypothesis that access to more valuable collateral increases risk-taking and leads to higher exit rates.

4.4 Comparative Statics

Similar to our analysis in Section 3, the empirical strategy presented so far in this section relies on controlling for observables to address the potential endogeneity of the homeownership decision. We now exploit several dimensions of cross-sectional heterogeneity of the main effect as additional evidence consistent with the collateral channel interpretation.

The first dimension we consider is industry characteristics. Our goal is to split the sample based on the industry-level likelihood that an entrepreneur faces credit constraint when starting its business. If our results are driven by the collateral channel, we expect the estimated effect to be stronger for entrepreneurs operating in industries where credit constraints are more prevalent. If, on the other hand, the results are driven by a wealth effect or selection into homeownership, we expect the effect to be uniform in this industry dimension.

To construct a measure of industry-level credit constraint at creation, we use the 2006 wave of

the SINE survey. This wave asks entrepreneurs about the main difficulties they face when creating their firm.[20] We construct a dummy variable equal to 1 when the entrepreneur self-reports difficulty of obtaining financing as one of the main difficulty in creating her firm, which is the case for 26% of the entrepreneurs in the sample. We then regress this dummy variable on the same set of control variables described in Section 4.2.1, in particular a set of 34 industry fixed effects. We retrieve these industry fixed effects, which serve as our proxy for credit constraints at the industry level. These fixed-effects tell us how much more likely an entrepreneur is to report difficulties in obtain financing in a given industry, conditional on observable characteristics.[21,22] We then split our sample of entrepreneurs into two groups: entrepreneurs with businesses operating in a below-median credit-constrained industry and entrepreneurs operating in an above-median credit-constrained industry. The results are reported in Table 9. For the sake of brevity, we only report the results using log(Assets), log(Sales), log(#Emp.) and log(Debt) as dependent variables. While the estimates of ϕ over these two samples are always positive and mostly statistically significant, we find that the effect estimated on the sample of above-median credit constrained industries are much larger. For instance, looking at employment as a dependent variable, we find a point estimate of .54*** in constrained industries and only .19*** in unconstrained industries. The p-value for this difference between the two estimates is .05**. Similarly, looking at assets as a dependent variable, we find a point estimate of 1.5*** in constrained industries and only .89*** in unconstrained industries. Overall, the evidence in Table 9 show that ϕ is significantly larger for entrepreneurs operating in industries where credit constraints at creation are more prevalent,

[20] Unfortunately, previous waves do not include this question, which is why we use the 2006 wave.

[21] The fixed effects range from -.2 to .3, with a standard deviation of .08. A firm in an industry at the 25$^{\text{th}}$ percentile of this industry-level financing constraint measure is 9.1 percentage point less likely to report obtaining financing as one of the main difficulty in creating the firm, relative to a firm in an industry at the 75$^{\text{th}}$ percentile.

[22] Another way to get at the role of financing constraints in explaining our results would be to split the sample of industries into high and low start-up capital. The results we obtain when doing such a split are mixed. We believe there is a natural explanation for this. We expect our effect to be stronger in industries where individuals tend to be on average more credit constrained. How much credit frictions bind is a function of two things: (1) the start-up capital needed to start the firm (2) the net worth of the entrepreneur. In the data, it is likely that start-up capital and the entrepreneur's wealth are positively correlated – wealthier individuals will tend to start in higher scale industries. If this is the case, then using industry start-up capital cannot be effective for discerning the role of the collateral channel.

and thus support the interpretation of our results in terms of housing shocks alleviating credit frictions.

Another dimension of cross-sectional heterogeneity we consider is based on unemployment. The underlying premise of this analysis is that obtaining outside financing, and in particular unsecured financing, is more difficult for entrepreneurs who are currently unemployed.[23] If our results are driven by the collateral channel, we would thus expect that the ϕ should be larger when estimated over the sample of unemployed entrepreneurs, for whom collateral values matter more. To test this idea, we split our sample into previously employed and previously unemployed individuals and estimate equation (2) on these two separate samples. The results are shown in Table A.10 for the outcome variables assets, sales, number of employees, and debt. The effect of collateral values on size, debt, and number of employees in the first fiscal year after creation is about twice as large for previously unemployed entrepreneurs than it is for previously employed entrepreneurs; the effect on sales is of a slightly smaller magnitude. All effects are economically significant. For an unemployed entrepreneur owning its house, an increase in house price growth from 1992 to 1997 of 11 percentage points (the inter-quartile range of house price growth in this sample) leads to assets at creation that are almost 18% larger. For previously employed entrepreneurs, this effect is only 6.9%. This difference between previous unemployed vs. employed entrepreneurs is most striking when looking at debt: for a previously unemployed entrepreneur owning its house, an increase in past house price growth by 11 percentage points lead to a 16.5% increase in debt at creation. This effect is only 5% for previously employed entrepreneurs and is not statistically significant.

[23] Using the 2006 wave of the SINE survey, we can gain some insight on the validity of this assumption. Controlling for all the observables described in Section 4.2.1, we find that relative to employed workers, unemployed individuals are, all else equal, 23% more likely to self-report obtaining outside finance as a main difficulty in creating their firm. Further supporting this hypothesis, "Easing access to credit for unemployed individuals" was one of the 20 priorities highlighted by the French Department of Labor in 2005 in its annual report.

5 Housing Collateral and Entrepreneurship in the Aggregate

In this section, we investigate whether the collateral channel we document on micro-data can be observed using aggregated, region-level, data on entrepreneurship. This is a useful exercise, first, because it serves as a robustness check for the magnitude of the effects estimated on micro-data by using alternative, exhaustive administrative datasets, but also because it allows us to get a direct empirical estimate of the macro-economic impact of house prices on entrepreneurial activity. For instance, it could be the case that firms started thanks to the collateral channel "crowd out" other firms that would have been created without it. Such a crowding out effect could make the difference-in-difference estimator more pronounced (and rightfully pointing at collateral channel effects), but the macro-economic importance would be less strong. Thus, aggregating the outcome variable at the economy-level would allow us to control for these crowding out effects, provided the economy is "closed enough". In this Section, we will aggregate results at the regional level (there are 20 regions in France).

5.1 Data

We first use the 1990 exhaustive French Census to compute the fraction of homeowners in 1990 at the region level. This is defined as the fraction of first houses (as opposed to secondary houses) in the region that are owned by their occupants. We also use the 1990 Census to compute the size of the active population in the region in 1990. 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 of creation, headquarters' location, legal form (limited liability corporation or sole proprietorship), and employment at creation. This data is available for the the 1992-2002 period. We also obtain information from INSEE on the industry composition of the workforce by region for 1990. This classification uses 5 large industries (agriculture, manufacturing, construction, for-profit services, non-profit services). The 1990 Labor Force Survey provides information on the median wage by

region in thousands of Francs. The final sample is defined over the 1992-2002 period and contains 349 observations. Table A.11 presents summary statistics for this sample.

5.2 Empirical Strategy

5.2.1 Specification

We estimate the following equation, where the unit of observation is now a region l in year t:

$$\begin{aligned}\ln(\text{New Firms}_{l,t}) = \quad & \alpha + \chi \cdot \%owners_l^{1990} \times \Delta p_l^{t-6 \to t-1} + \tau \cdot Z_l^{1990} \times \Delta p_l^{t-6 \to t-1} \\ & + \mu \cdot \%owners_l^{1990} \times \Delta \text{Unemp}_l^{t-6 \to t-1} + \delta_l + \eta_t + \varepsilon_{j,t}. \end{aligned} \tag{5}$$

$\%owners_l^{1990}$ is the fraction of homeowners in region l in 1990, $\Delta p_{l,t-6 \to t-1}$ is house price growth in region l in the five years preceding year t, δ_l are region fixed-effects, η_t are year fixed-effects, $\Delta \text{Unemp}_l^{t-6 \to t-1}$ is the variation in unemployment in region l from $t-6$ to $t-1$. The region-level controls Z included in equation (5) are: the fraction of the working population in 1990 in the region working in Manufacturing, the fraction of the working population in 1990 in the region working in Construction, the size of the region measured by its population from the 1990 Census, the logarithm of the median wage in the region, obtained from the labor force survey in 1990. $\ln(\text{New Firms}_{l,t})$ is the log of the number of newly-created firms in year t in region l. We also explore the effect of these collateral shocks across regions on employment in newly created firms. To do so, we exploit the fact that the exhaustive registry of new firms contains information on the number of jobs at creation and simply use, as an alternative dependent variable in equation (5), the log of all jobs in newly created firms in a region, at the time of creation.

Equation (5) is estimated through OLS. Since we are working with aggregate data at the region level, we would ideally like to cluster residuals at the region level. Because we only have 25 regions, however, standard clustering techniques may lead to under-estimate the true standard-errors. We thus report asymptotic standard errors clustered at the region level, but compute the associated

p-values using the wild bootstrap procedure of Cameron et al. (2008).[24]

5.2.2 Identification

Equation (5) can be thought of as an aggregation of equation (1). χ is the coefficient of interest. Regions are characterized by the fraction of homeowners living in the region. In regions with more homeowners, a given increase in house prices leads to a larger increase in collateral values, which, under the collateral channel hypothesis, leads to an increase in the number of new firm created in the region. If we ran the regression without further controls, the identifying assumption would be that, absent the collateral channel, aggregate self-employment in regions with different levels of homeownership would react similarly to variations in house prices. However, regions with more homeowners may have a population with observable characteristics that lead to a larger elasticity of firm creation to the local business cycle. To account for this possibility, we control for some observable characteristics (the Z_l described in Section 5.2.1) and the interaction of these characteristics with past house price growth in the region. Due to the limited size of the sample, however, we cannot include too many control variables. This is a limitation of this aggregate analysis. To account for the possibility that regions with a large fraction of homeowners are more sensitive to the local business cycle, we interact the $\%owners$ variable with variations in the region-level unemployment rate from $t-6$ to $t-1$.

5.3 Main Results

Table 10 presents the estimated χ from equation (5). As mentioned in Section 5.2.1, we use two distinct measures of entrepreneurial activity at the département level: (1) the log number of firms

[24]This bootstrap procedure is done in the following way. We first compute the t-statistics for the estimates of χ in equation (5), using the standard clustering approach. We then re-estimate this model under the null that $\chi = 0$, which provides with estimates for the residuals $\hat{\epsilon}$ and the other coefficient estimates in equation (5). We construct a wild dependent variable by multiplying all the estimated residuals in a given region by a random number generated from $\{-1, 1\}$ with equal probability and adding the resulting number to the predicted value generated under the null. We then simply estimate equation (2) using this wild dependent variable instead of the actual data and compute the t-statistics of the estimate of
chi. By comparing the original t-statistics for the estimate of χ with the distribution of these wild t-statistics, we obtain a p-value for the original t-statistics.

created in the region (Panel A) and (2) the log number of employees in newly created firms in the region (Panel B). We report both unweighted results (columns (1) and (3)) and results weighted by the region population (columns (2) and (4)). Columns (1) and (2) only include year and region fixed effects. Columns (3) and (4) include the region-level observables, Z_l and their interaction with past house price growth. Columns (5) and (6) include the interaction of variations in the region-level unemployment rate and $\%owners$ 1990. All specifications yield positive and highly statistically significant coefficients. In our sample, entrepreneurial activity responds significantly more to past increases in house prices in regions with a larger fractions of homeowners.

The magnitudes we report in Table 10 are large, both for the effect of collateral values on business counts and induced job creation. Looking at the number of firms created, column 5 of Panel A —the unweighted specification including the full set of controls— shows that, taken at the median homeownership rate (.58%), a 19 percentage points increase in Δp (the inter-quartile range of house price growth in this sample) leads to an increase in the number of newly created firms by 6% in the region (.54×.58×.19). Given that on average, a region has on average about 6,800 new firms created every year, this implies the creation of about 400 firms per region per year.

Looking at jobs in newly-created firms, we see that a similar increase in house prices, in a region at the median homeownership rate, leads to an increase in the number of jobs in newly-created firms of about 13%. Given that there are on average about 9,000 jobs in newly-created firms per region, this implies an increase in the number of jobs in newly-created firms of about 1,200 jobs per region per year. This is about 30,000 jobs nationwide, which represent about .16% 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.

6 Conclusions

Using variations in local house prices, as well as variations in homeownership, this paper shows that collateral frictions are a significant determinant 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 a channel through which house prices can affect aggregate activity that 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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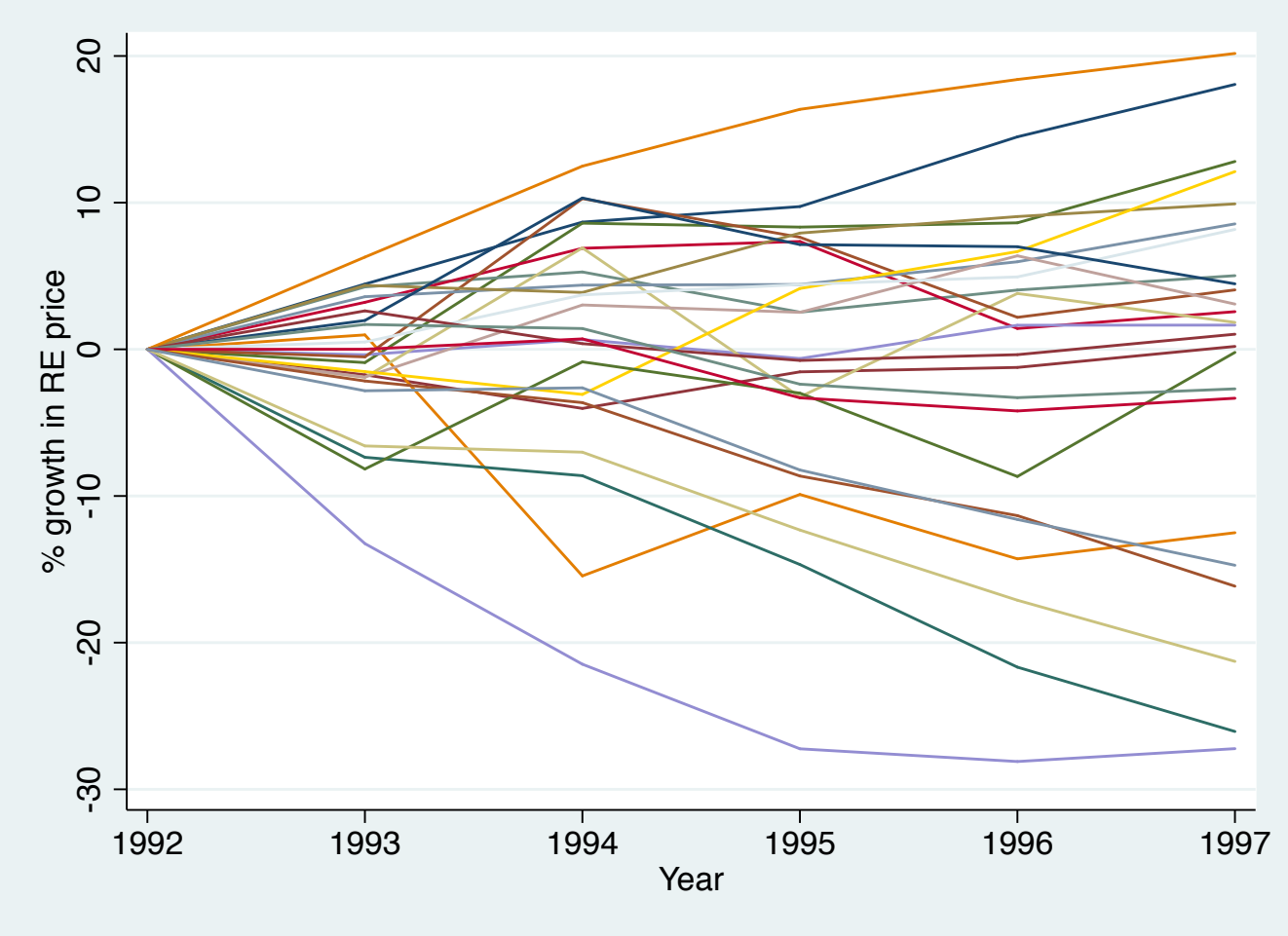

Figure 1: Cumulative House Price Growth across Regions.
The graph shows the cumulative house price growth from 1992 to 1997 across the 25 regions in the sample.

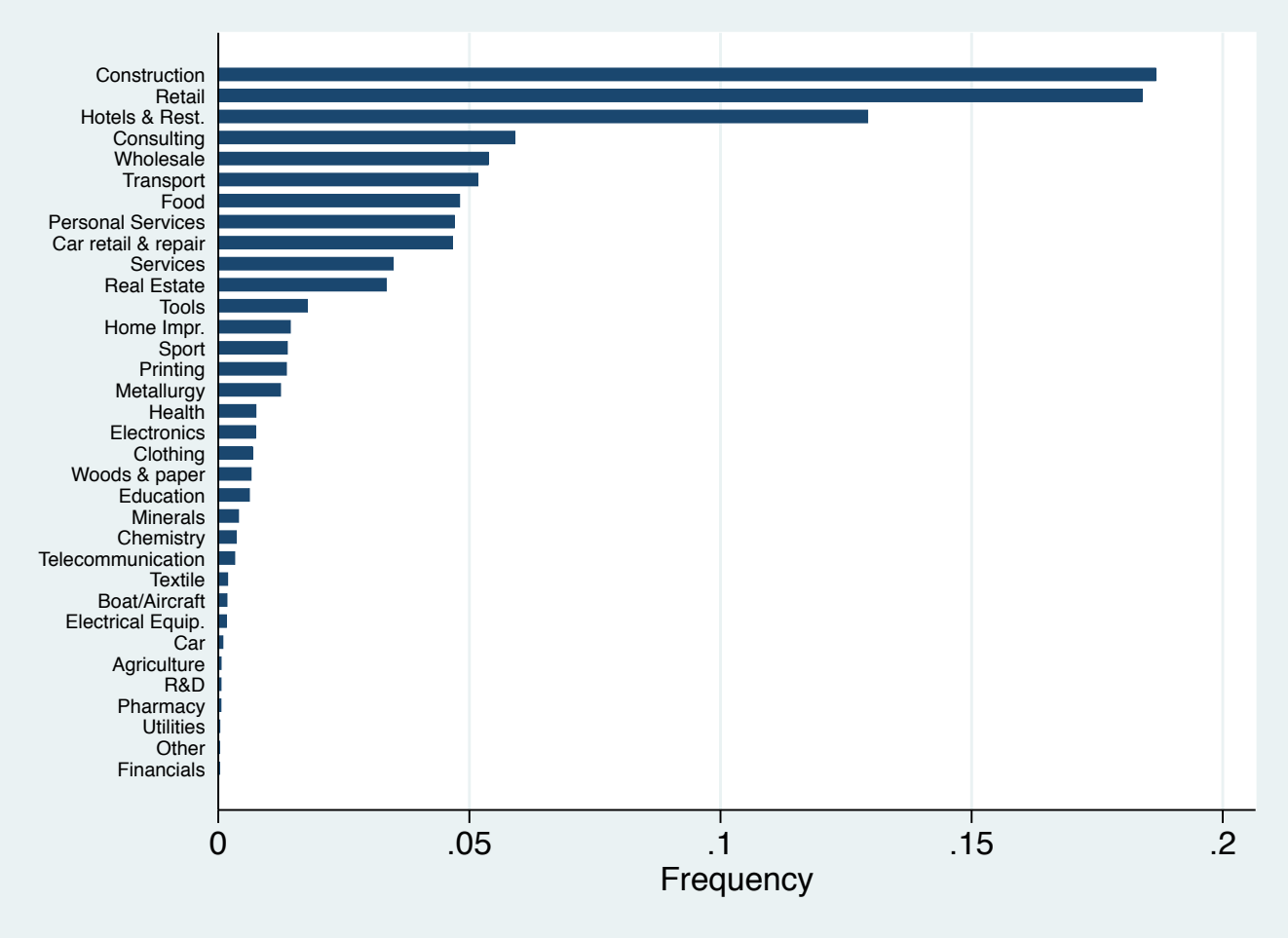

Figure 2: Industry Distribution of Newly Created Businesses.
The graph shows the industry distribution of the businesses created in the first half of 1998 that are in our sample.

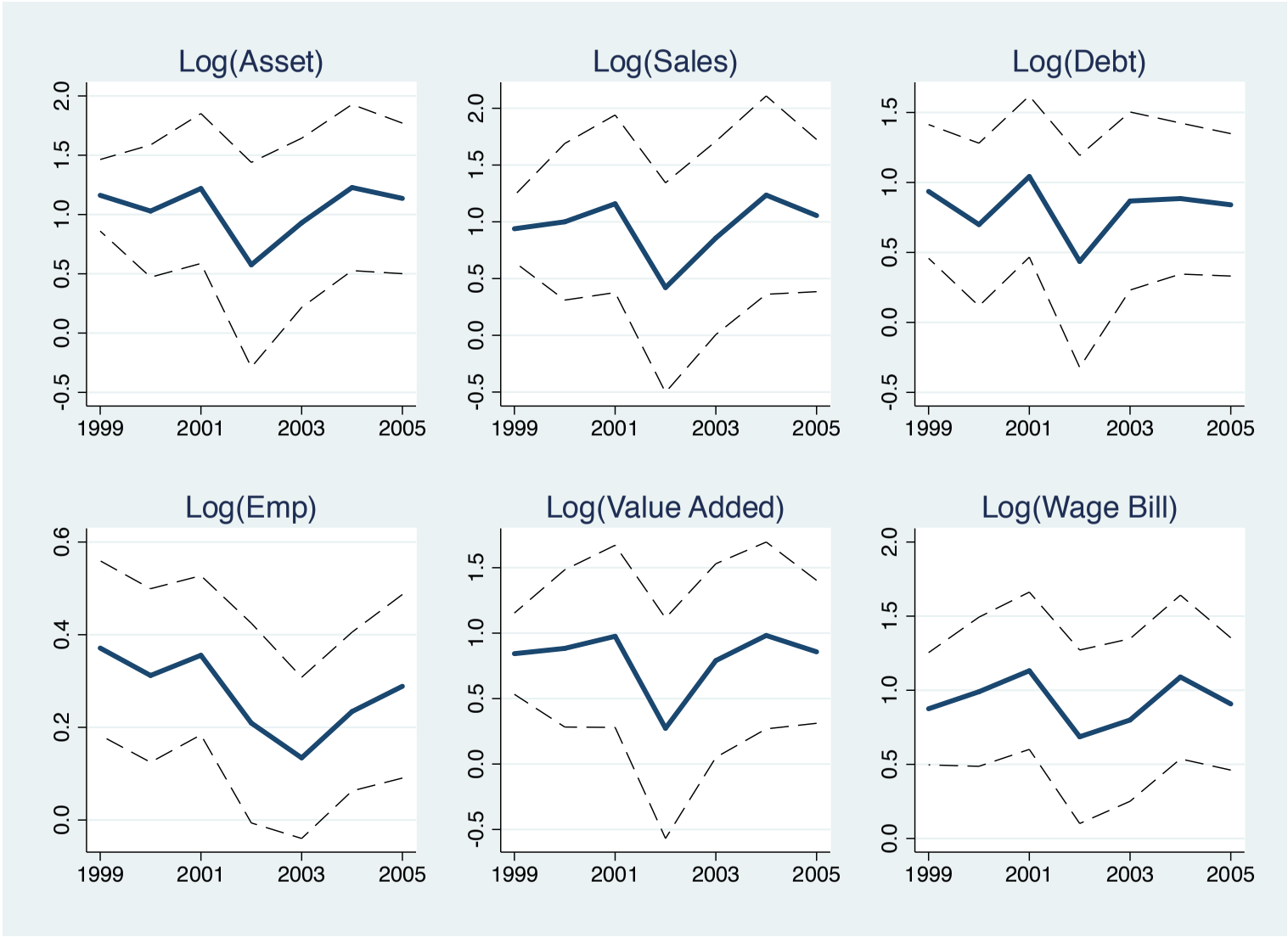

Figure 3: Real Estate Capital Gains and Entrepreneurial Outcomes: Long-run Effects
The graphs plot the point estimate and the 90% confidence intervals of the ϕ_t coefficient in equation (3), where the outcome variable is measured in year t and is assigned a value of 0 if the firm has exited the sample. 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 owner's home, whether the entrepreneur has an entrepreneurial background, a serial entrepreneur dummy as well as all interactions of these controls with Δp. These regressions also include département fixed effects, as well as region-by-industry fixed effects. Standard errors are clustered at the region by ownership level. The outcome variables are the logarithm of one plus total assets (top left panel), total sales (top right panel), total debt (bottom left panel), total employment (bottom right panel).

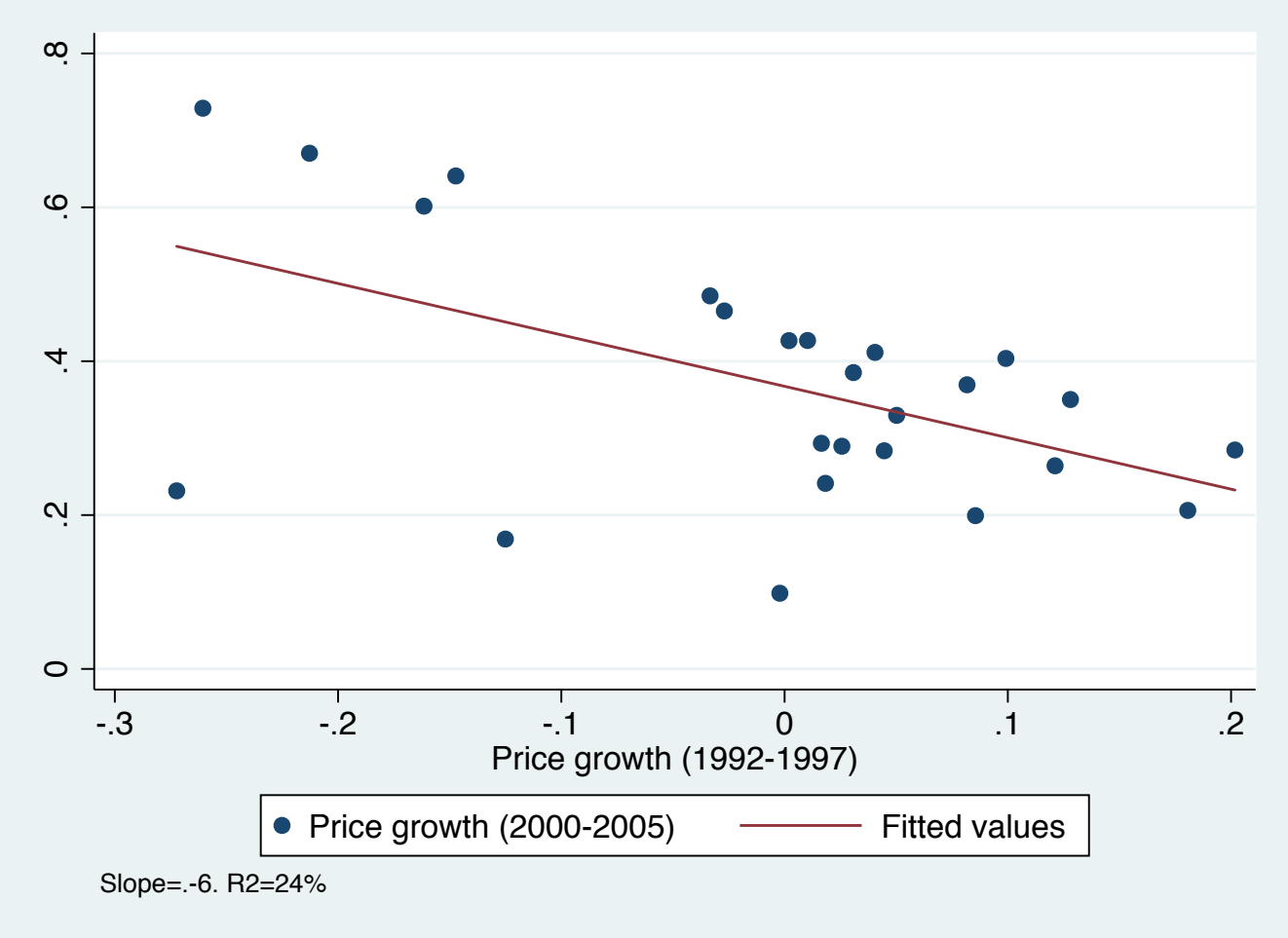

Figure 4: Correlation between House Price Growth from 1992-1997 and House Price Growth from 1999-2004 across the 25 regions in our sample

Table 1: 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 (1 for male, 0 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								
$p_{t-1}/p_{t-6} - 1$	0.14	0.20	-0.03	0.04	0.10	0.20	0.31	1,026
$\text{Unemp}_{t-1} - \text{Unemp}_{t-6}$	0.29	1.72	-2.00	-1.00	0.35	1.57	2.60	1,026
Panel B: Individual characteristics								
Entrepreneurship	0.01	0.12	0.00	0.00	0.00	0.00	0.00	73,390
Homeowner	0.58	0.49	0.00	0.00	1.00	1.00	1.00	73,390
log(wage)	8.74	1.77	8.41	8.77	9.02	9.32	9.68	73,390
Unemployed	0.07	0.25	0.00	0.00	0.00	0.00	0.00	73,390
Age	42.95	8.79	31.00	36.00	43.00	50.00	55.00	73,390
Gender	0.87	0.33	0.00	1.00	1.00	1.00	1.00	73,390
Foreigner	0.07	0.25	0.00	0.00	0.00	0.00	0.00	73,390
Education								
College Degree	0.08	0.28	0.00	0.00	0.00	0.00	0.00	73,390
Some College	0.08	0.26	0.00	0.00	0.00	0.00	0.00	73,390
High School	0.11	0.31	0.00	0.00	0.00	0.00	1.00	73,390
Technical	0.35	0.48	0.00	0.00	0.00	1.00	1.00	73,390
No Diploma	0.38	0.49	0.00	0.00	0.00	1.00	1.00	73,390

Table 2: Comparison between Homeowners and Renters in the Extensive-Margin Sample

	Renters	**Owners**	**T-Test**
Entrepreneurship	0.013	0.015	2.66***
log(wage)	8.467	8.939	35.89***
Unemployed	0.102	0.038	35.29***
Age	40.079	45.049	78.78***
Gender	0.195	0.076	48.81***
Foreigner	0.107	0.036	39.05***
Education			
College Degree	0.072	0.091	9.21***
Some College	0.073	0.078	2.55**
High School	0.101	0.112	4.76***
Technical	0.326	0.365	11.13***
No Diploma	0.428	0.353	20.61***

Table 3: Real Estate Capital Gains before Creation and Probability to Start a Business
The table reports the estimates of a linear probability model regressing 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). All regressions include département fixed effects, as well as region-by-year fixed effects. Column (1) has no additional control. Column (2) adds controls for education (four dummies), as well as their interaction with Δp. Column (3) adds controls and interaction terms for previous year salary (or UI benefit if eligible) and previous year employment status. Column (4) adds controls and interaction terms for age. Column (5) adds controls and interaction terms for gender and nationality. Column (6) adds controls and interaction terms for current industry. Column (7) adds controls and interaction terms for the respondent's father's job description. Column (8) additionally controls for change in unemployment rate in the département from year t-6 to year t-1, as well as its interaction with the ownership dummy. Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	Entrepreneurship Dummy							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Owner × Δp	.014***	.014***	.014***	.011***	.011***	.01***	.0099***	.0094***
	(.0022)	(.0023)	(.0023)	(.0027)	(.0026)	(.0025)	(.0026)	(.0026)
Owner	.00091	.0003	.0053***	.0054***	.0036***	.0025***	.0022**	.0025***
	(.00078)	(.00075)	(.00085)	(.00091)	(.00086)	(.00085)	(.00088)	(.00092)
Owner × Δunemp								-.0006**
								(.00029)
ΔUnemp								.0015
								(.0014)
Controls	None	Educ.	Wage & Emp.	Age	Gender & national.	fathers' job descr.	Industry	All
Controls×Δp								
Département FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	73,390	73,390	73,390	73,390	73,390	73,390	73,390	73,390
Adj. R^2	0.00	0.00	0.05	0.05	0.05	0.07	0.07	0.07

Table 4: Real Estate Capital Gains before Creation and Probability to Start a Business: Leverage.
The table reports the estimates of a linear probability model regressing 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). Column (1) and (2) have no additional control. Column (3) and (4) adds controls for education (four dummies), previous year employment status, age, gender, nationality, father's job description and current industry, as well as their interactions with house price growth in the region from year t-6 to year t-1. Column (5) and (6) additionally controls for change in unemployment rate in the département from year t-6 to year t-1, and its interaction with the home ownership dummy. Column (1), (3) and (5) are run on the sample of individuals who are either renters or owners who still have an outstanding mortgage on their house. Column (2), (4) and (6) are run on the sample of individuals who are either renters or owners with no outstanding mortgage on their house. All regressions include département fixed effects, as well as region-by-year fixed effects. Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	Entrepreneurship Dummy					
	(1)	(2)	(3)	(4)	(5)	(6)
	owners with leverage			owners without leverage		
Owner × Δp	.0023	-.00085	-.0016	.032***	.025***	.025***
	(.0024)	(.0026)	(.0025)	(.0044)	(.0045)	(.0045)
Owner	.00086	.00079	.0012	.0012	-.00051	-.00032
	(.00082)	(.00098)	(.00097)	(.0011)	(.0011)	(.0011)
Owner × Δunemp			-.00075*			-.00046
			(.00041)			(.0004)
ΔUnemp			.00032			.002
			(.0017)			(.0017)
Controls	No	Yes	Yes	No	Yes	Yes
Controls×Δp	No	Yes	Yes	No	Yes	Yes
Département FE	Yes	Yes	Yes	Yes	Yes	Yes
Region × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	56,698	56,698	56,698	47,533	47,533	47,533
Adj. R^2	0.00	0.03	0.03	0.00	0.03	0.03

Table 5: Summary Statistics for the Intensive-Margin Analysis.
This table presents summary statistics for the sample used in the analysis of the effect of real estate capital gains on size at creation, conditional on entry. Panel A describes regional characteristics (house price growth, GDP growth from 1992-1997) and département characteristics (change in unemployment rate from 1992-1997). 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, entrepreneurial background, gender, serial entrepreneur dummy, education measured by four dummies (No Diploma, Technical Training, High School Diploma, College Diploma), occupation previous to starting up a business (Employed, Unemployed, and Out-of-Workforce and prior job description (Craftsman, executive, intermediary profession, employee, worker)).

	Mean	Std. Dev.	p(10)	p(25)	p(50)	p(75)	p(90)	Obs.
Panel A: Regional characteristics								
$\frac{p^{97}}{p^{92}} - 1$	-0.00	0.13	-0.21	-0.03	0.02	0.08	0.13	25
$\Delta \text{GDP}^{92-97}$	0.14	0.03	0.11	0.12	0.13	0.16	0.17	25
$\Delta \text{unemp.}^{92-97}$	1.48	0.73	0.65	0.93	1.45	1.90	2.47	94
Panel B: Firm characteristics (1999 book values, in thousand Euros)								
Asset	131.77	1,072.05	7.17	18.60	41.01	96.65	221.81	9,125
Sales	209.44	1,284.92	14.94	35.52	73.63	172.11	396.67	9,125
Debt	102.46	970.58	3.20	11.43	29.88	76.22	179.43	9,125
# Employees	1.85	6.71	0.00	0.00	0.00	2.00	4.00	9,125
Value Added	130.78	616.59	9.91	24.24	48.94	112.81	250.17	9,125
Total Wage	49.99	218.94	0.46	3.05	12.65	44.82	108.85	9,125
Panel C: Entrepreneur characteristics								
Home Owner	0.29	0.45	0.00	0.00	0.00	1.00	1.00	9,125
Sole Proprietor	0.44	0.50	0.00	0.00	0.00	1.00	1.00	9,125
Business at Home	0.41	0.49	0.00	0.00	0.00	1.00	1.00	9,125
Age	37.51	9.33	26.00	30.00	36.00	44.00	50.00	9,125
Entr. background	0.72	0.45	0.00	0.00	1.00	1.00	1.00	9,125
Gender (Male==1)	0.77	0.42	0.00	1.00	1.00	1.00	1.00	9,125
Serial Ent.	0.26	0.44	0.00	0.00	0.00	1.00	1.00	9,125
Education								
No Diploma	0.18	0.39	0.00	0.00	0.00	0.00	1.00	9,125
Technical training	0.41	0.49	0.00	0.00	0.00	1.00	1.00	9,125
High School Diploma	0.18	0.39	0.00	0.00	0.00	0.00	1.00	9,125
College Diploma	0.23	0.42	0.00	0.00	0.00	0.00	1.00	9,125
Prior occupation								
Employed	0.53	0.50	0.00	0.00	1.00	1.00	1.00	9,125
Unemployed	0.36	0.48	0.00	0.00	0.00	1.00	1.00	9,125
Out-of-Workforce	0.10	0.30	0.00	0.00	0.00	0.00	1.00	9,125
Prior job description								
Craftsman	0.15	0.36	0.00	0.00	0.00	0.00	1.00	9,125
Executive	0.20	0.40	0.00	0.00	0.00	0.00	1.00	9,125
Intermediary prof.	0.10	0.30	0.00	0.00	0.00	0.00	1.00	9,125
Employee	0.25	0.43	0.00	0.00	0.00	1.00	1.00	9,125
Worker	0.21	0.41	0.00	0.00	0.00	0.00	1.00	9,125

Table 6: 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)	3.79	3.55	7.29***
Log(Sales)	4.42	4.07	10.93***
Log(Debt)	3.51	3.10	12.12***
Log(1+# Employees)	0.69	0.43	15.07***
Log(Value Added)	4.02	3.71	10.09***
Log(Total Wage)	2.76	2.27	13.41***
Panel B: Entrepreneur characteristics			
Sole Proprietor	0.38	0.59	19.41***
Business at Home	0.26	0.77	50.57***
Age	36.83	39.16	10.9***
Entr. background	0.72	0.70	2.17**
Gender (Male==1)	0.76	0.81	5.35***
Serial Ent.	0.28	0.22	5.54***
Education			
No Diploma	0.17	0.21	3.9***
Technical training	0.38	0.47	8.27***
High School Diploma	0.20	0.15	5.85***
College Diploma	0.25	0.18	7.88***
Prior occupation			
Employed	0.53	0.54	.23
Unemployed	0.36	0.37	.91
Out-of-Workforce	0.11	0.09	1.85*
Previous Job Description			
Craftsman	0.16	0.14	2.27**
Executive	0.21	0.18	3.26***
Intermediary prof.	0.10	0.11	1.46
Employee	0.27	0.21	5.68***
Worker	0.17	0.30	13.71***

Table 7: Real Estate Capital Gains before Creation and Entrepreneurial Outcomes

The table reports the coefficient of regressions of 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, whether the entrepreneur has an entrepreneurial background, a serial entrepreneur dummy as well as all interactions of these controls with Δp. The regressions also include département fixed effects, as well as region-by-industry fixed effects. The outcomes we consider are logarithm of 1 plus total assets (column (1)), sales (column (2)), number of employees (column (3)), total debt (column (4)), value added (column (5)), and total wage bill (column (6)). Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	log(Assets)	log(Sales)	log(#Emp.)	log(Debt)	log(Value Added)	log(Wage Bill)
	(1)	(2)	(3)	(4)	(5)	(6)
Owner × Δp	1.2***	.94***	.37***	.94***	.84***	.88***
	(.18)	(.17)	(.11)	(.28)	(.19)	(.23)
Owner	.079***	-.13***	-.11***	-.035	-.14***	-.22***
	(.027)	(.026)	(.015)	(.029)	(.024)	(.03)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls × Δp	Yes	Yes	Yes	Yes	Yes	Yes
Département FE	Yes	Yes	Yes	Yes	Yes	Yes
Region × Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Price change	0	0	0	0	0	0
Observations	9,125	9,125	9,125	9,125	9,125	9,125
Adj. R^2	0.29	0.20	0.30	0.32	0.22	0.30

Table 8: Real Estate Capital Gains before Creation and long-run Outcomes
The table reports the coefficient of regressions of entrepreneurial outcomes – measured in year $t \in [2000, 2005]$ – 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, whether the entrepreneur has an entrepreneurial background, a serial entrepreneur dummy as well as all interactions of these controls with Δp. The regressions also include département fixed effects, as well as region-by-industry fixed effects. The outcomes we consider are logarithm of 1 plus total assets (column (1)), sales (column (2)), number of employees (column (3)), total debt (column (4)), value added (column (5)), and total wage bill (column (6)). To control for endogenous attrition, we assign a 0 value to the dependent variable for firms that exit the sample. Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	log(Assets)	log(Sales)	log(# Emp.)	log(Debt)	log(Val. Add.)	log(Wage)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: 2000						
Owner × Δp	1***	1**	.31***	.7**	.88**	.99***
	(.33)	(.41)	(.11)	(.35)	(.36)	(.3)
Panel B: 2001						
Owner × Δp	1.2***	1.2**	.36***	1***	.98**	1.1***
	(.38)	(.47)	(.1)	(.34)	(.41)	(.32)
Panel C: 2002						
Owner × Δp	.58	.42	.21	.44	.27	.69*
	(.52)	(.55)	(.13)	(.45)	(.5)	(.35)
Panel D: 2003						
Owner × Δp	.93**	.86*	.13	.87**	.79*	.8**
	(.43)	(.51)	(.1)	(.38)	(.44)	(.33)
Panel D: 2004						
Owner × Δp	1.2***	1.2**	.23**	.88***	.98**	1.1***
	(.42)	(.52)	(.1)	(.32)	(.43)	(.33)
Panel D: 2005						
Owner × Δp	1.1***	1.1**	.29**	.84***	.86**	.91***
	(.38)	(.4)	(.12)	(.3)	(.33)	(.27)
Observations	9,125	9,125	9,125	9,125	9,125	9,125

Table 9: Real Estate Capital Gains before Creation and Entrepreneurial Outcomes: Industry-level Financing Constraints

The table reports the coefficient of regressions of 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, whether the entrepreneur has an entrepreneurial background, a serial entrepreneur dummy as well as all interactions of these controls with Δp. The regressions also include département fixed effects, as well as region-by-industry fixed effects. The outcomes we consider are logarithm of 1 plus total assets (column (1) and (2)), sales (column (3) and (4)), number of employees (column (5) and (6)), total debt (column (7) and (8)). Standard errors are shown in parentheses and are clustered at the region-by-ownership level. Column (1), (3), (5), (7) (resp. (2), (4), (6), (8)) run the regression on the sample of industry below (resp. above) the median industry financing constraint measure. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	Industry Financing constraint							
	High	Low	High	Low	High	Low	High	Low
	log(Assets)		log(Sales)		log(#Emp.)		log(Debt)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Owner × Δp	1.5***	.89***	1.4***	.48	.54***	.19**	1.1**	.84**
	(.31)	(.31)	(.28)	(.33)	(.19)	(.093)	(.44)	(.36)
Owner	.03	.12***	-.18***	-.081**	-.099***	-.11***	-.083	-.00075
	(.049)	(.034)	(.049)	(.036)	(.023)	(.016)	(.05)	(.037)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls × Δp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Département FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region × Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,364	4,753	4,364	4,753	4,364	4,753	4,364	4,753
Adj. R^2	0.29	0.29	0.20	0.18	0.29	0.30	0.33	0.30

Table 10: 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). Panel A uses the log of the total number of firms created in the region as a dependent variable. Panel B uses the log of the total number of jobs in newly created firms in the region as a dependent variable. Columns (1), (3) and (5) are unweighted. Columns (2) (4) and (6) are weighted by the size of the region population. 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. Columns (5) and (6) add controls for changes in the region unemployment rate in the past five year, as well as its interaction with the fraction of homeowners in the region (% Owner). Robust standard errors clustered by region are shown in parentheses. The p-value (CGM) reported in the table is for the % Owner $\times\Delta$ p coefficient and is instead calculated using clustering at the region level (k=25) using Cameron et al. (2008)'s wild-cluster bootstrap. *, **, and *** mean statistically different from zero at 10%, 5%, and 1% levels of significance.

	Measure of Entrepreneurial Activity					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Log(# New Firms)						
% owners 1990 $\times \Delta p$	.58***	.56***	.58***	.57***	.52**	.54***
	(.11)	(.08)	(.19)	(.16)	(.2)	(.18)
Δp	-.24***	-.23***	1.2*	1.5***	1.3*	1.6***
	(.036)	(.027)	(.65)	(.5)	(.72)	(.55)
p-value (CGM)	.008	.002	.054	.04	.062	.038
Panel B: Log(# Jobs in New Firms)						
% owners 1990 $\times \Delta p$	.58**	.55***	1.1**	1.1**	1.2*	1.2**
	(.22)	(.18)	(.48)	(.4)	(.64)	(.53)
Δp	-.23*	-.2*	-.56	-.17	-.7	-.21
	(.12)	(.099)	(1.9)	(1.5)	(2.2)	(1.6)
p-value (CGM)	.006	.028	.054	.048	.04	.04
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
(Industry composition, Size, Wage)	No	No	Yes	Yes	Yes	Yes
(Industry composition, Size, Wage) $\times \Delta p$	No	No	Yes	Yes	Yes	Yes
Δ Unemp	No	No	No	No	Yes	Yes
% OwnerΔ Unemp	No	No	No	No	Yes	Yes
Observations	349	349	349	349	349	349
Adj. R^2	0.996	0.996	0.996	0.996	0.996	0.996
Weighted	No	Yes	No	Yes	No	Yes

Online Appendix

This Appendix contains additional Figures and Tables. It is intended for online publication only.

A Additional Tables

Table A.1: 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). All regressions are linear probability models and include département fixed effects, as well as region-by-year fixed effects. Column (1) has no additional control. Column (2) adds controls for education (four dummies). Column (3) adds controls for previous year salary (or UI benefit if eligible) and previous year employment status. Column (4) controls for age. Column (5) controls for gender and nationality. Column (6) controls for current industry. Column (7) adds controls and interaction terms for the respondent's father's job description. Column (8) additionally controls for change in unemployment rate in the département from year t-6 to year t-1. Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	Entrepreneurship Dummy							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δp	-.005*	-.0047	-.0033	-.0034	-.0035	-.0029	-.0027	-.0027
	(.003)	(.003)	(.0026)	(.0026)	(.0026)	(.003)	(.0031)	(.003)
College		.014***	.024***	.024***	.024***	.026***	.021***	.021***
		(.0023)	(.0026)	(.0026)	(.0026)	(.0025)	(.0025)	(.0025)
Some College		.0049**	.011***	.012***	.013***	.014***	.011***	.011***
		(.002)	(.002)	(.002)	(.002)	(.0021)	(.002)	(.002)
High School		.0053***	.011***	.011***	.012***	.013***	.011***	.011***
		(.0014)	(.0015)	(.0016)	(.0016)	(.0016)	(.0016)	(.0016)
Technical Training		.00082	.0035***	.0041***	.0034***	.0035***	.0032***	.0032***
		(.00088)	(.00083)	(.00086)	(.00086)	(.00085)	(.00085)	(.00085)
Log(wage) or log(UI)			-.016***	-.016***	-.017***	-.016***	-.016***	-.016***
			(.0013)	(.0013)	(.0013)	(.0013)	(.0013)	(.0013)
Unemployed			-.039***	-.039***	-.038***	-.012*	-.012*	-.012*
			(.0055)	(.0055)	(.0055)	(.0063)	(.0063)	(.0063)
Age				.0002***	.00022***	.0003***	.00029***	.00029***
				(.000055)	(.000055)	(.000058)	(.00006)	(.00006)
Sex					-.017***	-.015***	-.016***	-.016***
					(.0012)	(.0011)	(.0011)	(.0011)
Foreign					-.00099	-.0026	-.0022	-.0022
					(.0023)	(.0024)	(.0025)	(.0025)
Département FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	None	Educ.	Wage & Emp.	Age	Gender & national.	fathers' job descr.	Industry	All
Observations	73,390	73,390	73,390	73,390	73,390	73,390	73,390	73,390
Adj. R^2	0.00	0.00	0.05	0.05	0.05	0.06	0.07	0.07

Table A.2: Real Estate Capital Gains before Creation and Probability to Start a Business: House Size.
The table reports the estimates of a linear probability model regressing 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). Column (1) and (2) have no additional control. Column (3) and (4) adds controls for education (four dummies), previous year employment status, age, gender, nationality, father's job description and current industry, as well as their interactions with house price growth in the region from year t-6 to year t-1. Column (5) and (6) additionally controls for change in unemployment rate in the département from year t-6 to year t-1, and its interaction with the home ownership dummy. Column (1), (3) and (5) are run on the sample of individuals who are either renters or owners of a house with 3 rooms or less ("Small Houses"). Column (2), (4) and (6) are run on the sample of individuals who are either renters or owners of a house with 4 rooms or more ("Large Houses"). All regressions include département fixed effects, as well as region-by-year fixed effects. Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	Entrepreneurship Dummy					
	(1)	(2)	(3)	(4)	(5)	(6)
	Small houses			Large Houses		
Owner × Δp	.0068*	.0013	.0017	.021***	.016***	.014***
	(.0038)	(.0036)	(.0036)	(.0033)	(.0037)	(.0037)
Owner	.00058	.0009	.00053	-.00099	-.0013	-.00066
	(.0011)	(.0013)	(.0013)	(.0012)	(.0013)	(.0012)
Owner × Δunemp			.00079*			-.0014***
			(.00043)			(.00049)
ΔUnemp			.0021			.00047
			(.0022)			(.0018)
Controls	No	Yes	Yes	No	Yes	Yes
Controls×Δp	No	Yes	Yes	No	Yes	Yes
Département FE	Yes	Yes	Yes	Yes	Yes	Yes
Region × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,722	22,722	22,722	47,590	47,590	47,590
Adj. R^2	0.00	0.03	0.03	0.00	0.03	0.03

Table A.3: Real Estate Capital Gains before Creation and Probability to Start a Business: Income.
The table reports the estimates of a linear probability model regressing 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). Column (1) and (2) have no additional control. Column (3) and (4) adds controls for education (four dummies), previous year employment status, age, gender, nationality, father's job description and current industry, as well as their interactions with house price growth in the region from year t-6 to year t-1. Column (5) and (6) additionally controls for change in unemployment rate in the département from year t-6 to year t-1, and its interaction with the home ownership dummy. Column (1), (2) and (3) (resp. (4), (5) and (6)) are run on the sample of individuals whose past-year income is below the median (resp. above the median). All regressions include département fixed effects, as well as region-by-year fixed effects. Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	Entrepreneurship Dummy					
	(1)	(2)	(3)	(4)	(5)	(6)
	Income below median			Income above median		
Owner × Δp	.038***	.023***	.023***	.0069**	.0047*	.0042*
	(.0059)	(.0063)	(.0064)	(.0028)	(.0025)	(.0024)
Owner	.0041***	.0014	.0016	.0001	-.0007	-.00038
	(.0013)	(.0013)	(.0013)	(.00095)	(.001)	(.0011)
Owner × Δunemp			-.00044			-.00053
			(.00049)			(.00043)
ΔUnemp			.00029			.0013
			(.0024)			(.0016)
Controls	No	Yes	Yes	No	Yes	Yes
Controls×Δp	No	Yes	Yes	No	Yes	Yes
Département FE	Yes	Yes	Yes	Yes	Yes	Yes
Region × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	36,983	36,983	36,983	36,407	36,407	36,407
Adj. R^2	0.01	0.05	0.05	0.00	0.02	0.02

Table A.4: Real Estate Capital Gains before Creation and Entrepreneurial Outcomes: Robustness to Controls.
The table reports the coefficient of regressions of 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). Column 1 to 4 (resp. 5 to 8) use log of one plus total assets (resp. sales) as a dependent variable. Column 1 and 5 simply have département fixed-effects as well as region-industry fixed effects. Column 2 and 6 controls for industry (36 industries) and legal status of the firm (sole proprietorship vs. corporation), as well as their interaction with house price growth. Column 3 and 7 add controls and interaction terms for education, previous job description as well as previous employment status. Column 4 and 8 add controls and interaction terms for age, gender, entrepreneurial background and past entrepreneurial activity. Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	log(Assets)				log(Sales)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Owner × Δp	.95***	1.1***	1***	1.2***	.86***	.98***	.85***	.94***
	(.19)	(.13)	(.15)	(.18)	(.16)	(.15)	(.15)	(.17)
Owner	-.24***	-.052**	-.073***	.079***	-.39***	-.25***	-.27***	-.13***
	(.028)	(.021)	(.023)	(.027)	(.021)	(.02)	(.021)	(.026)
Controls	None	+ Indust. &	+ educ., job	+ age, sex	None	+ Indust. &	+ educ., job	+ age, sex
Controls × Δp	None	legal status	descr.& empl.	entr. act.	None	legal status	descr.& empl.	entr. act.
Département FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region × Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Price change	0	0	0	0	0	0	0	0
Observations	9,125	9,125	9,125	9,125	9,125	9,125	9,125	9,125
Adj. R^2	0.05	0.25	0.28	0.29	0.05	0.17	0.19	0.20

Table A.5: Real Estate Capital Gains and Entrepreneurial Outcomes: Robustness to local GDP and unemployment
The table reports the coefficient of regressions of 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, whether the entrepreneur has an entrepreneurial background, a serial entrepreneur dummy as well as all interactions of these controls with Δp. We also control for the region-level GDP growth from 1992 to 1997 interacted with the home ownership dummy and the département-level change in unemployment from 1992 to 1997, also interacted with the home ownership dummy. The regressions include département fixed effects, as well as region-by-industry fixed effects. The outcomes we consider are logarithm of 1 plus total assets (column (1)), sales (column (2)), number of employees (column (3)), total debt (column (4)), value added (column (5)), and total wage bill (column (6)). Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	log(Assets)	log(Sales)	log(#Empl.)	log(Debt)	log(Value Added)	log(Wage Bill)
	(1)	(2)	(3)	(4)	(5)	(6)
Owner × Δp	1.1***	.9***	.37***	.94***	.81***	.88***
	(.19)	(.18)	(.12)	(.29)	(.18)	(.22)
Owner	.32***	.062	.013	.14	.13	.13
	(.091)	(.18)	(.072)	(.1)	(.14)	(.15)
Owner × ΔGDP	-1.1*	-.93	-.74*	-1.1*	-1.4*	-2.3***
	(.57)	(.89)	(.38)	(.61)	(.73)	(.74)
Owner × ΔUnemp	-.052**	-.038	-.012	-.009	-.04	-.024
	(.024)	(.035)	(.016)	(.029)	(.029)	(.035)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls × Δp	Yes	Yes	Yes	Yes	Yes	Yes
Département FE	Yes	Yes	Yes	Yes	Yes	Yes
Region × Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,125	9,125	9,125	9,125	9,125	9,125
Adj. R^2	0.29	0.20	0.30	0.32	0.22	0.30

Table A.6: Real Estate Capital Gains and Entrepreneurial Outcomes: Controlling for future house price growth.
The table reports the coefficient of regressions of 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, whether the entrepreneur has an entrepreneurial background, a serial entrepreneur dummy as well as all interactions of these controls with Δp. The sample contains only firms started by entrepreneurs 40 and older. The regressions include département fixed effects, as well as region-by-industry fixed effects. The outcomes we consider are logarithm of 1 plus total assets (column (1)), sales (column (2)), number of employees (column (3)), total debt (column (4)), value added (column (5)), and total wage bill (column (6)). Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	log(Assets)	log(Sales)	log(# Emp.)	log(Debt)	log(Value Added)	log(Wage Bill)
	(1)	(2)	(3)	(4)	(5)	(6)
Owner $\times \Delta p^{92-97}$	1.2***	.98***	.37***	1***	.81***	.79***
	(.18)	(.16)	(.12)	(.26)	(.17)	(.28)
Owner $\times \Delta p^{99-04}$	.15	.093	-.0042	.2	-.061	-.17
	(.15)	(.14)	(.094)	(.2)	(.13)	(.17)
Owner	.024	-.16***	-.11**	-.11	-.11**	-.15**
	(.061)	(.057)	(.041)	(.074)	(.05)	(.069)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls $\times \Delta p$	Yes	Yes	Yes	Yes	Yes	Yes
Département FE	Yes	Yes	Yes	Yes	Yes	Yes
Region $\times$ Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,125	9,125	9,125	9,125	9,125	9,125
Adj. R^2	0.29	0.20	0.30	0.32	0.22	0.30

Table A.7: Real Estate Capital Gains and Entrepreneurial Outcomes: Excluding Paris and neighboring département. The table reports the coefficient of regressions of 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, whether the entrepreneur has an entrepreneurial background, a serial entrepreneur dummy as well as all interactions of these controls with Δp. Paris and the "petite couronne" (three départements around Paris) are excluded from the sample. The regressions include département fixed effects, as well as region-by-industry fixed effects. The outcomes we consider are logarithm of 1 plus total assets (column (1)), sales (column (2)), number of employees (column (3)), total debt (column (4)), value added (column (5)), and total wage bill (column (6)). Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	log(Assets)	log(Sales)	log(#Emp.)	log(Debt)	log(Value Added)	log(Wage Bill)
	(1)	(2)	(3)	(4)	(5)	(6)
Owner × Δp	1.1***	.95***	.39***	.97***	.85***	.83***
	(.25)	(.2)	(.13)	(.29)	(.19)	(.28)
Owner	.084**	-.13***	-.11***	-.032	-.14***	-.21***
	(.032)	(.029)	(.017)	(.03)	(.026)	(.033)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls × Δp	Yes	Yes	Yes	Yes	Yes	Yes
Département FE	Yes	Yes	Yes	Yes	Yes	Yes
Region × Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,448	8,448	8,448	8,448	8,448	8,448
Adj. R^2	0.29	0.21	0.30	0.32	0.23	0.31

Table A.8: Real Estate Capital Gains before Creation and long-run Outcomes: Robustness
The table reports the coefficient of regressions of entrepreneurial outcomes – measured in year $t \in [2000, 2005]$ – 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, whether the entrepreneur has an entrepreneurial background, a serial entrepreneur dummy as well as all interactions of these controls with Δp. The regressions also include département fixed effects, as well as region-by-industry fixed effects. The outcomes we consider are logarithm of 1 plus total assets (column (1)), sales (column (2)), number of employees (column (3)), total debt (column (4)), value added (column (5)), and total wage bill (column (6)). Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	Log(Assets)					
	2000	2001	2002	2003	2004	2005
Panel A: Controlling for realized house price growth						
Owner $\times \Delta p^{92-97}$	1***	1.3***	.5	.8*	1.1***	.9**
	(.34)	(.42)	(.43)	(.41)	(.37)	(.45)
Owner $\times \Delta p^{99-t}$	-.046	.3	-.59	-.37	-.24	-.35
	(.86)	(.95)	(.63)	(.52)	(.33)	(.26)
Observations	9,125	9,125	9,125	9,125	9,125	9,125
Panel B: Conditional on survival						
Owner $\times \Delta p$	.51**	.6***	.47*	.58**	.71***	.69**
	(.21)	(.17)	(.25)	(.27)	(.19)	(.29)
Observations	8,440	7,108	6,873	6,307	6,081	5,583

Table A.9: Real Estate Capital Gains before Creation and Survival

This table reports coefficient estimates of a linear probability model of the failure hazard in year 1998+t, fh(t), defined as failure probability in year 1998+ t conditional on survival until year 1998+ $t-1$, as a function of the interaction of house price growth from 1992 to 1997 (Δp) and a dummy for individual home ownership (Owner). Columns (7) and (8) use 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, whether the entrepreneur has an entrepreneurial background, a serial entrepreneur dummy as well as all interactions of these controls with Δp. The regressions also include département fixed effects, as well as region-by-industry fixed effects. Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	fh(1)	fh(2)	fh(3)	fh(4)	fh(5)	fh(6)	$\mathbb{P}[year(failure) < 2005]$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Owner × Δp	-.1	-.0023	.056	-.024	-.13**	-.028	-.14	-.18**
	(.089)	(.051)	(.088)	(.069)	(.057)	(.063)	(.1)	(.086)
Owner	-.007	-.059***	-.022**	-.022***	-.021***	-.018*	-.097***	-.034
	(.0089)	(.0075)	(.0085)	(.0075)	(.0066)	(.0092)	(.012)	(.058)
Owner × ΔGDP								-.14
								(.37)
Owner × ΔUnemp								-.029***
								(.01)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls × Δp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Département FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region × Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,125	8,268	7,051	6,610	6,107	5,709	9,125	9,125
Adj. R^2	0.02	0.03	0.02	0.01	-0.00	0.01	0.06	0.06

Table A.10: Real Estate Capital Gains before Creation and Entrepreneurial Outcomes: Unemployment Split

The table reports the coefficient of regressions of 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, whether the entrepreneur has an entrepreneurial background, a serial entrepreneur dummy as well as all interactions of these controls with Δp. The regressions also include département fixed effects, as well as region-by-industry fixed effects. The outcomes we consider are logarithm of one plus total assets (column (1) and (2)), sales (column (3) and (4)), number of employees (column (5) and (6)) and total debt (column (7) and (8)). Column (1), (3), (5) and (7) run the estimation on the sample of entrepreneurs who were previously unemployed. Column (2), (4), (6) and (8) run the estimation on the sample of entrepreneurs who were previously employed. Standard errors are shown in parentheses and are clustered at the region-by-ownership level. *, **, and *** mean statistically different from zero at 10%, 5% and 1% levels of significance.

	log(Assets)		log(Sales)		log(# Emp.)		log(Debt)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Unemp.	Emp.	Unemp.	Emp.	Unemp.	Emp.	Unemp.	Emp.
Owner × Δp	1.5***	.82**	1.1***	.95***	.6***	.28	1.4***	.61
	(.42)	(.41)	(.27)	(.33)	(.21)	(.18)	(.39)	(.46)
Owner	.055	.13***	-.16***	-.093*	-.13***	-.086***	-.049	.018
	(.044)	(.047)	(.035)	(.051)	(.02)	(.026)	(.048)	(.047)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls × Δp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Département FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region × Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Price change	0	0	0	0	0	0	0	0
Observations	4,255	4,870	4,255	4,870	4,255	4,870	4,255	4,870
Adj. R^2	0.24	0.27	0.22	0.15	0.29	0.26	0.29	0.29

Table A.11: Summary Statistics for the Aggregate Analysis.
This table presents summary statistics for the sample we use in our analysis of the effect of real estate capital gains on region-level entrepreneurial activity. The sample period is 1992-2002.

	Mean	Std. Dev.	p(10)	p(25)	p(50)	p(75)	p(90)	Obs.
log(#*firms created*)	8.57	0.71	7.77	8.02	8.50	8.99	9.72	349
log(#*jobs created*)	8.84	0.72	8.03	8.26	8.81	9.24	10.02	349
Fraction homeowners	55.27	9.18	39.33	55.25	56.70	61.10	64.25	349
Median Wage (in k Francs)	6.00	0.64	5.50	5.59	5.80	6.00	7.12	349
Workforce composition								
Agriculture	0.06	0.04	0.00	0.03	0.06	0.09	0.10	349
Manufacturing	0.21	0.06	0.12	0.18	0.23	0.25	0.28	349
Construction	0.07	0.01	0.06	0.07	0.07	0.08	0.09	349
For Profit Services	0.38	0.07	0.32	0.33	0.36	0.41	0.47	349
Non Profit Services	0.27	0.03	0.24	0.26	0.28	0.29	0.30	349

B Additional Figures

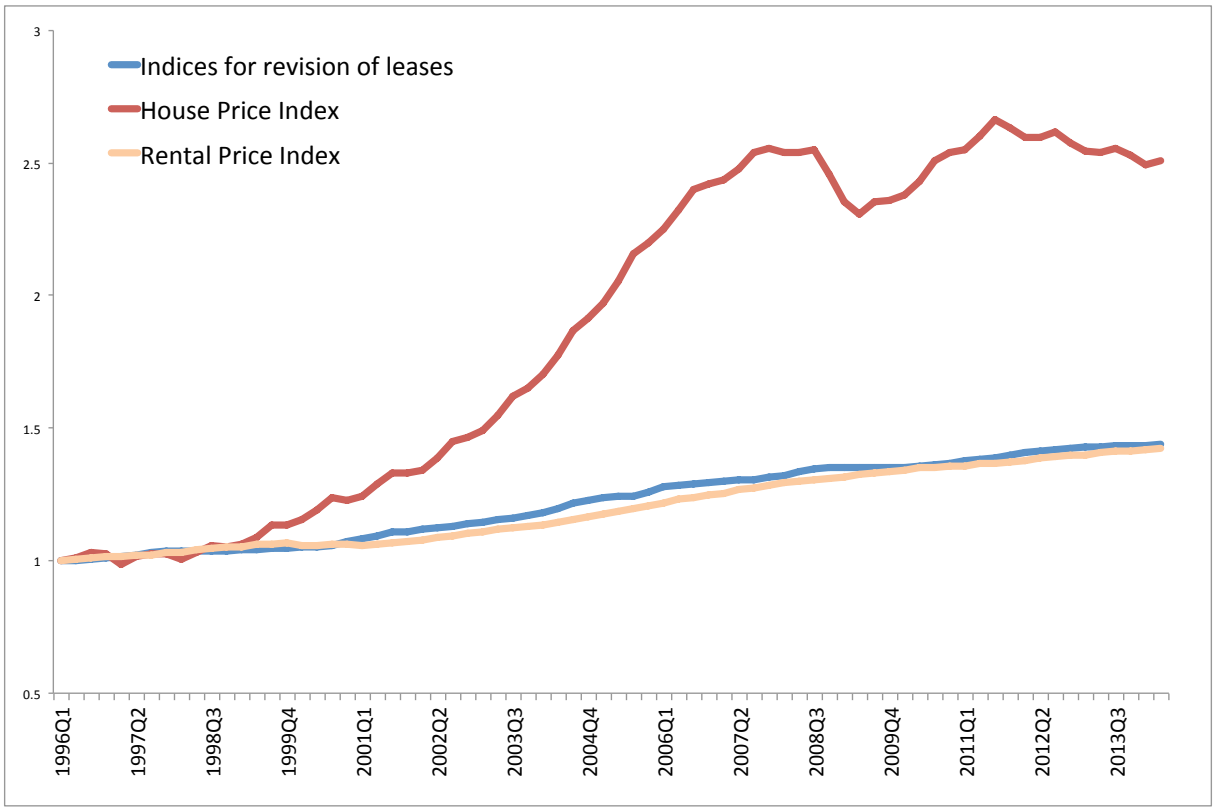

Figure B.1: Real Estate Price Index, Rent Index and Rent Constraint in France
The Figure plots (1) the national house price index from INSEE (red line) (2) an index of renting cost from the CPI (orange line) and (3) the index used to constrain changes of individual rents within a lease for the 1996-2014 period (blue line).