

Housing Collateral and Entrepreneurship

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Abstract

We provide clean evidence that collateral constraints restrict entrepreneurial activity. We use shocks to house prices, along with individual data on homeownership, to investigate the effect of collateral shocks to firm creation, post entry growth, and long term survival. First, at the intensive margin, we show that entrepreneurs who own their private homes are able to grow their businesses faster if their house values appreciate faster. Long-run effects are particularly strong for survival, and for employment in newly started firms. Second, at the extensive margin, owning a house that appreciates faster increases the probability of becoming an entrepreneur at the individual level. Finally, in the aggregate, we show that ownership rates interacted with price growth predicts entrepreneurial activity and employment by newly created firms at the regional level.

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1 Introduction

This paper provides evidence that entrepreneurs face credit constraints, which restrict firm creation, post-entry growth, and survival, even over the long term. The existing literature documents a strong correlation between entrepreneurial wealth and the propensity to start or keep a business (Holtz-Eakin, Joulfaian, and Rosen, 1993). There is, however, a considerable debate about whether this is evidence of financial constraints. It may, for instance, be the case that wealthy entrepreneurs - through personal accumulation or inheritance - have more business opportunities for reasons that are orthogonal to their wealth (Hurst and Lusardi, 2004). In the absence of financial constraints, positive shocks to entrepreneurial wealth may lead to excessive investment, provided that entrepreneurs derive private benefits from remaining in business (Andersen and Nielsen, 2011). The question whether financing constraints significantly hinder firm creation and growth carries large policy implications, as it may justify public intervention in favor of small firm financing.

To contribute to this debate, this paper uses house price shocks, combined with micro-level data on private home ownership by the entrepreneur. Our methodology is a difference-in-difference approach where we compare entrepreneurial outcomes between firms whose entrepreneur is a homeowner, or not, depending on local house price growth. The double difference approach is crucial to alleviate potential endogeneity concerns that may arise in existing studies. The comparison between owners and non-owners allows to filter out region-specific economic shocks that may drive the creation, growth and survival of businesses. The comparison between regions where house prices grow and regions where they do not allows to control for individual differences in entrepreneurial ability. Moreover, the methodology is able to distinguish between banks' lending constraints and borrowers' collateral constraints.

We present results both for the intensive and extensive margin. First, we investigate post-entry firm growth and survival. We start with a large cross-section of French entrepreneurs who start their businesses in 1998, for whom we observe, among other things, their address and whether they own their home or not. We are able to match this information with firm-level accounting data for up to 10 years following the year of creation. We find that firms started by entrepreneurs who own their house and who have made significant capital losses in the 1990s, tend to grow less fast and survive less. The effect of the collateral constraints at firm creation is long lasting: in 2007,

firms started by constrained entrepreneurs in 1998 remain smaller in terms of assets and employment.

Our second set of results documents the impact of financing constraints on the probability to start a business: first, we look at the transition to entrepreneurship using the French Labor Force Survey (LFS), as a function of homeownership and local house prices. This dataset is a rotating panel which tracks individuals for three consecutive years. It is not therefore not suited to analyze long-term post-entry growth, but is perfectly adapted to the study of firm creation. Our data spans the years 1989 - 2002. We find that homeowners in regions where house prices appreciate more tend to create more businesses. We then confirm this result at the aggregate level, using alternative data sources for firm creation. We find that, at the regional level, total firm creation from the central registry (not from LFS) is more strongly correlated with house prices in regions where the fraction of homeowners is larger.

Our paper contributes to two literatures. Our main contribution is to the literature on financing constraints and entrepreneurship. The extant literature focuses on the link between entrepreneurial wealth and firm creation, growth or survival. Some papers focus on the role of inheritance shocks to firm quality and survival. [Holtz-Eakin, Joulfaian, and Rosen \(1993\)](#) find that, after a large inheritance, entrepreneurs are more likely to survive, a finding that they interpret as evidence of credit constraints. Using Danish data, [Andersen and Nielsen \(2011\)](#) find that the quality of businesses that survive after a large inheritance tends to be lower, suggesting that entrepreneurs may have private benefits of surviving. It could be argued that the fact of inheriting one's wealth may be related to business opportunities, e.g., through family connections. In this context, identification our paper has the advantage on relying on a more exogenous wealth shock. In this vein, [Hurst and Lusardi \(2004\)](#) and [Adelino, Schoar, and Severino \(2013\)](#) are closer to our paper, as they also look at the link between house prices and entrepreneurship. The two main differences are that (1) our data includes information on homeownership, which allows to control well for local economic shocks and (2) our data allows us to track not only entry into entrepreneurship (extensive margin), but also post entry growth (intensive margin) - even over the long term - and survival.

Second, this paper contributes to the emerging literature on the link between economic activity and the supply of collateral in the economy ([Black, De Meza, and Jeffreys, 1996](#)). When house prices increase, firms and households have more collateral

to pledge, which raises borrowing capacity. This collateral channel rests on financial frictions (Bernanke and Gertler, 1986; Kiyotaki and Moore, 1995). Recent papers have documented the link between house prices and household borrowing and consumption (Mian, Rao, and Sufi, 2011), the link between real estate prices and corporate investment (Chaney, Sraer, and Thesmar, 2012; Cvijanovic, 2011), and the link between house prices and the creation of small establishments (Adelino, Schoar, and Severino, 2013). To this literature, we contribute by (1) shifting the focus to a non-US country (France) and (2) much more importantly by focusing on entrepreneurial activity and growth. In this respect, Adelino, Schoar, and Severino (2013) is the closest paper. A key difference is that our French data allow us to go down to the entrepreneur level, use information on home ownership, and investigate entry, exit and post-entry growth at the entrepreneur level.

2 Data

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3 Empirical Strategy

3.1 Intrinsic Margin Individual-Level Regressions

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3.2 Extrinsic Margin Individual-Level Regressions

The extensive margin regressions at the individual level make use of a labor force survey “enquete employ”. It is a rotating panel. Each household is surveyed for 3 consecutive years and then disappears from the sample. We have data from 1990 to 2002. Note that we observe not only whether the household is dependently employed or works as an entrepreneur during these years, but also whether the household owns or rent its house.

We drop retirees and students from the sample, and keep only people aged 20 to 64. Next, we keep only the individuals in the (final) year 3 of the survey. (We need households to be in the panel at least 2 years, so we can know their employment status

at the end of the previous year.) Among these individuals, we keep only those that are not entrepreneurs in year 2. We can thus look at the probability of becoming an entrepreneur by calculating the frequency of being an entrepreneur in year 3, conditional on not being an entrepreneur in year 2.

The probability of becoming an entrepreneur in year 3 conditional on not being an entrepreneur at year 2 is about 1.3%. We define a similar set of control variables as the existing literature uses: education dummies, sex dummy, foreign national dummy, past-year wage (or UI benefit if unemployed), a dummy for past year work status (employed vs. unemployed), and age.

We then run probit regressions of the following form:

$$\begin{aligned} & \text{Pr}(\text{Entrepreneur in year 3} \mid \text{not entrepreneur in year 2}) \\ &= \beta (\text{Owner}(t-1) \times \text{Price growth}(t-6 \rightarrow t-1)) \\ &+ \gamma X_i \times \text{Price growth}(t-6 \rightarrow t-1) + \text{DEP}_i + \text{year-FE} + \varepsilon_i \end{aligned}$$

All non-interacted terms are included as well. Standard errors are clustered at the regional level. Linear regressions are reported as well. They give similar results.

3.3 Extrinsic Margin Department-Level Regressions

The sample period for the department-level extensive margin regressions is 1990 to 2005, which is the complete data set at our disposal. The main specification is:

$$\begin{aligned} & \text{Log}(\text{No. of new firms created})_{it} = \text{DEP}_i + \delta_t + \beta (\text{FRACTION OWNERS in 1990}_i) \\ & \times \text{PRICE GROWTH IN LAST FIVE YEARS}_{it} + \gamma (\text{CONTROLS in 1990}_i) \times \text{PRICE} \\ & \text{GROWTH IN LAST FIVE YEARS}_{it} + \varepsilon_{it} \end{aligned}$$

where i is a department (similar in size to a county in the United States). The regressions we report cluster errors at the region level. Similar results obtain with clustering at the department level.

PRICE GROWTH is defined using a region-based dataset until 1998 and then using a novel hand-collected dataset at the department level from 1998 onward.¹ We

¹Regions are larger than departments; we only have department-level data at our disposal going back to 1998.

normalize both samples to be 1 in 1998, so that indexing is not a problem.

FRACTION of OWNERS in 1990 is defined using the 1990 census, and is therefore very precise. It is the fraction of first houses (as opposed to secondary houses) in the department that are owned by their occupant.

CONTROLS include

- (i) Fraction of working population in 1990 in the department working in Agriculture, Manufacturing, Construction, Service and non-profit Service. This is a precise measure from INSEE
- (ii) Size of the department by population from the 1990 census
- (iii) Log(Median wage) from the “Enquete Emploi” in 1990
- Department Fixed Effects. That is, the model is identified from within-department changes in log of new firms created, i.e., the growth rate of entrepreneurship.

In further sets of results, we use as dependent variables

1. $\text{Log}(\text{Employment in newly created firms})_{it}$.
2. Number of new firms created normalized by the population in the department
3. Employment in newly created firms normalized by the population in the department

4 Results

We present three sets of results, from which we conclude that the collateral channel constrains entrepreneurial activity both at the intensive and at the extensive margin. First, existing entrepreneurs are able to grow their businesses faster when they were beneficiaries of stronger home price increases in the previous years, or if they were able to avoid being hit by a housing market crash. Second, dependently employed homeowners benefiting from stronger house price increases are more likely to start a business than non-homeowners or homeowners with less home price appreciation. Third, counties experiencing higher house price appreciation and higher ownership rates experience more subsequent entrepreneurial activity and employment in newly started firms.

4.1 Intrinsic Margin Individual-Level Results

Table 1 shows that being a Paris home owner during the 1993-1998 crash is correlated with 26-30% lower assets, sales, debt, and 70% fewer employees. Profitability (EBIT) is not significantly affected. This suggest that the results on assets, sales, etc. do not stem from selecting particularly talented or untalented entrepreneurs into our sample.

Table 2 shows that conditional on being an entrepreneur and owning a house, a 10% stronger house price appreciation translates into 5-8% higher assets, sales, and debt, significantly more employees, and as above, insignificantly higher profitability.

Figures 1 and 2 show that businesses are affected in the long run by collateral constraints incurred early in their life. While significance nominally disappears for some intermediate years, the effect on house price increases or a housing crash is generally persistent. Particularly striking is the effect on employment.

4.2 Extrinsic Margin Individual-Level Results

Table 3 reports probabilities for becoming an entrepreneur, conditional on not having been an entrepreneur and on owning a house in previous years, as a function of house price growth. The effect is strongly significantly positive in all specifications.

Table 4 shows that price growth in the region does not by itself make it more likely that individuals start businesses. This result rules out that entrepreneurship is constrained in our sample through the bank lending channel as is was the case in Japan [Gan \(2007\)](#). It also rules out that the effect is driven by a general good sentiment in a particular region: in that case, all entrepreneurs, home owners or not, should equally benefit.

4.3 Extrinsic Margin Region-Level Results

Table 5 reports that home ownership rates interacted with price growth are positively related with the number of subsequent business starts. For example, a 50% home ownership rate with a 20% higher house price growth over 5 years translates into roughly 7% more business starts.

Table 6 shows that not only the number of new businesses, but also employment in these businesses, positively depends on the interaction of ownership and house price growth.

Tables 7 and 8 show that ownership rate interacted with price growth also predicts the share of the population that starts new businesses, or that works in newly created businesses.

Figure 3 illustrates this relationship. It plots the elasticity of the region-level entrepreneurship rate to 5-year home price growth as a function of home ownership 8 years before the entrepreneurship rate is measured. For each department separately, we run a time-series regression of $\text{Log}(\text{No.of new firms created})_t$ on department-level price growth in the last five years. The graph is a simple scatter plot of these elasticities as a function of the fraction of owners in 1990. The slope is positive, which is to be interpreted analogously to the interaction results reported above.

5 Conclusions

This paper provided evidence that collateral frictions matter for the creation of new firms, as well as their growth and employment, both at the individual and regional level. The channel was shown to be different from a house money effect, i.e., from consumers benefiting from increased house prices, and different from the bank lending channel, which would affect home-owning and non-owning entrepreneurs alike. We conclude that collateral frictions are an important constraint for entrepreneurial success and employment in newly created firms.

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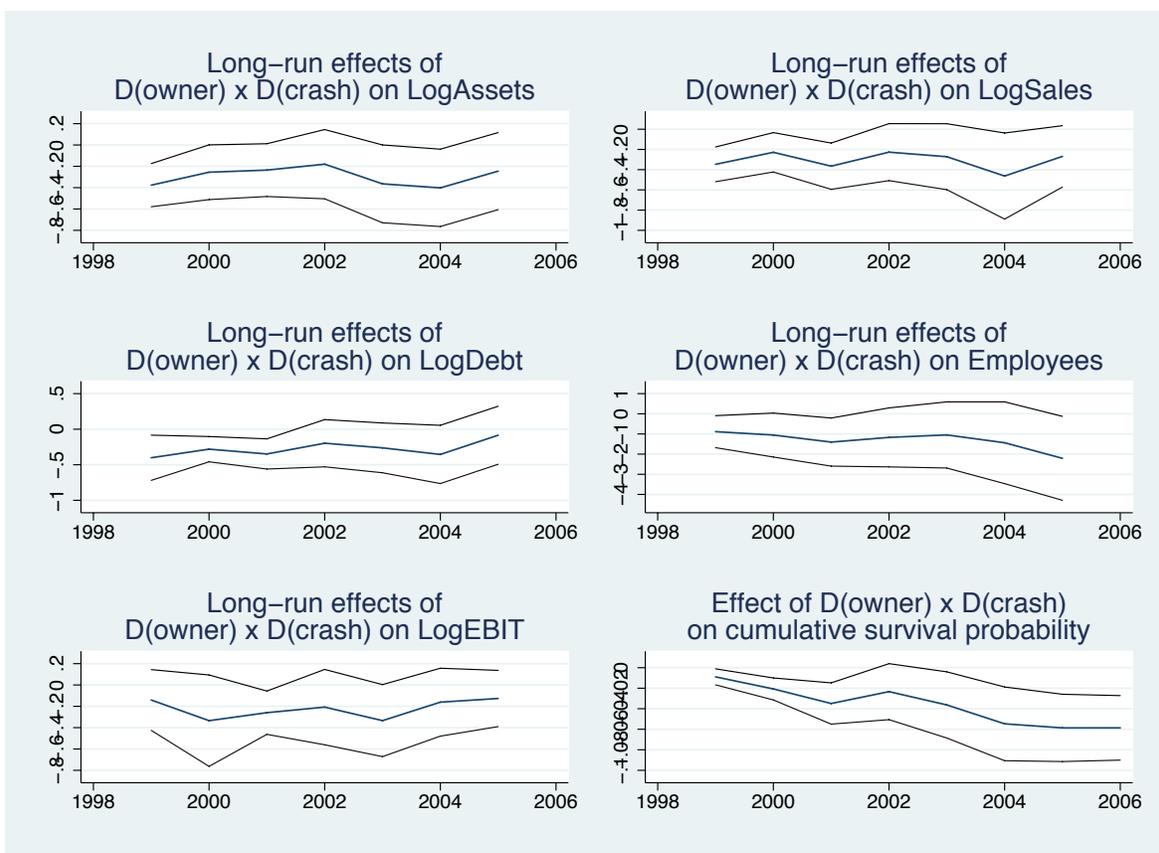


Figure 1: Long-run effects of being a private home owner during a house price crash on several outcome variables of young firms (intensive margin, individual-level). The graphs plot coefficients and 5% confidence intervals from regressions of year- t outcome variables on the interaction of an ownership dummy and dummy of being in a region with a house price crash (Paris) in the 5 years prior to creating the firm. Asset and sales growth, employment, and survival probabilities of newly created firms are significantly negatively related over many years to the entrepreneur being exposed to a collateral shock. Debt is marginally related, and EBIT is unrelated to collateral shocks, suggesting that the results are not due to selecting particularly talented or untalented entrepreneurs.

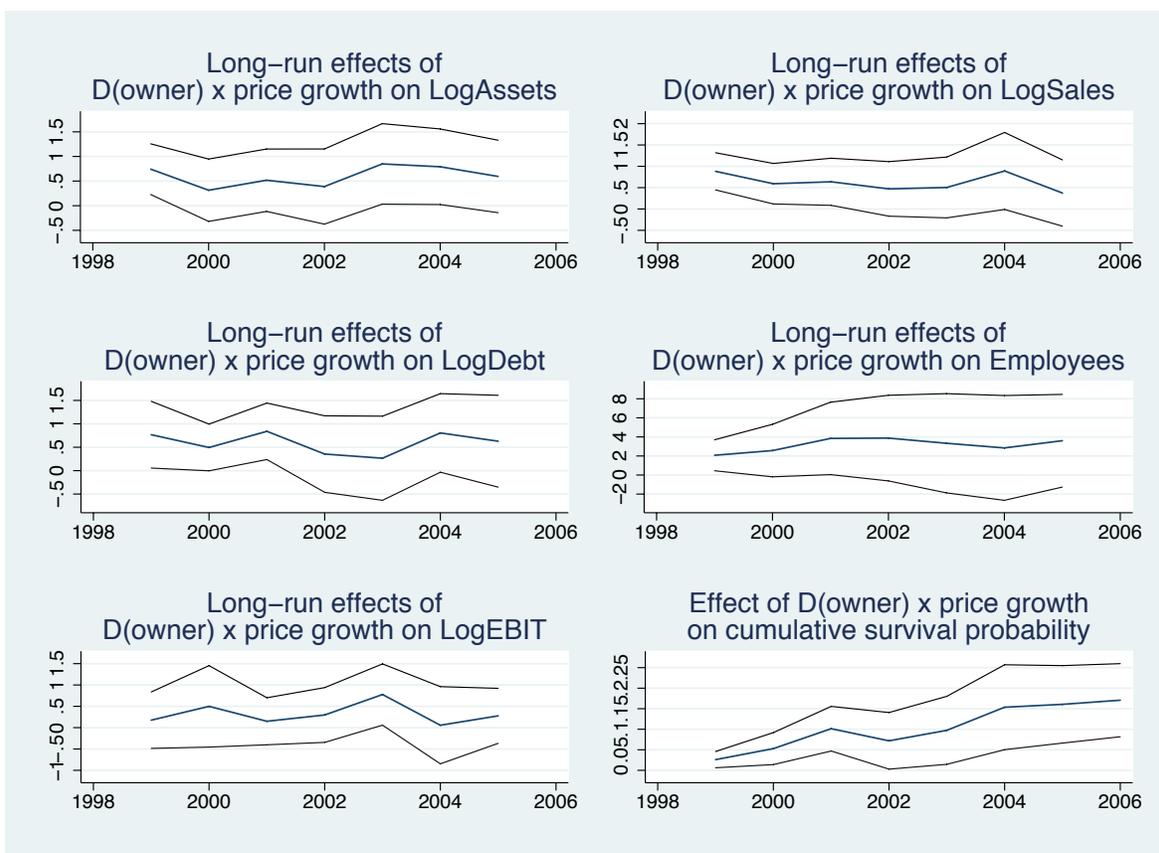


Figure 2: Long-run effects of collateral value appreciation on several outcome variables of young firms (intensive margin, individual-level). The graphs plot coefficients and 5% confidence intervals from regressions of year- t outcome variables on the interaction of an ownership dummy and region-level house price growth over the 5 years prior to creating the firm. Asset and sales growth, employment, and survival probabilities of newly created firms are significantly negatively related over many years to the entrepreneur being exposed to a collateral shock. Debt is marginally related, and EBIT is unrelated to collateral shocks, suggesting that the results are not due to selecting particularly talented or untalented entrepreneurs.

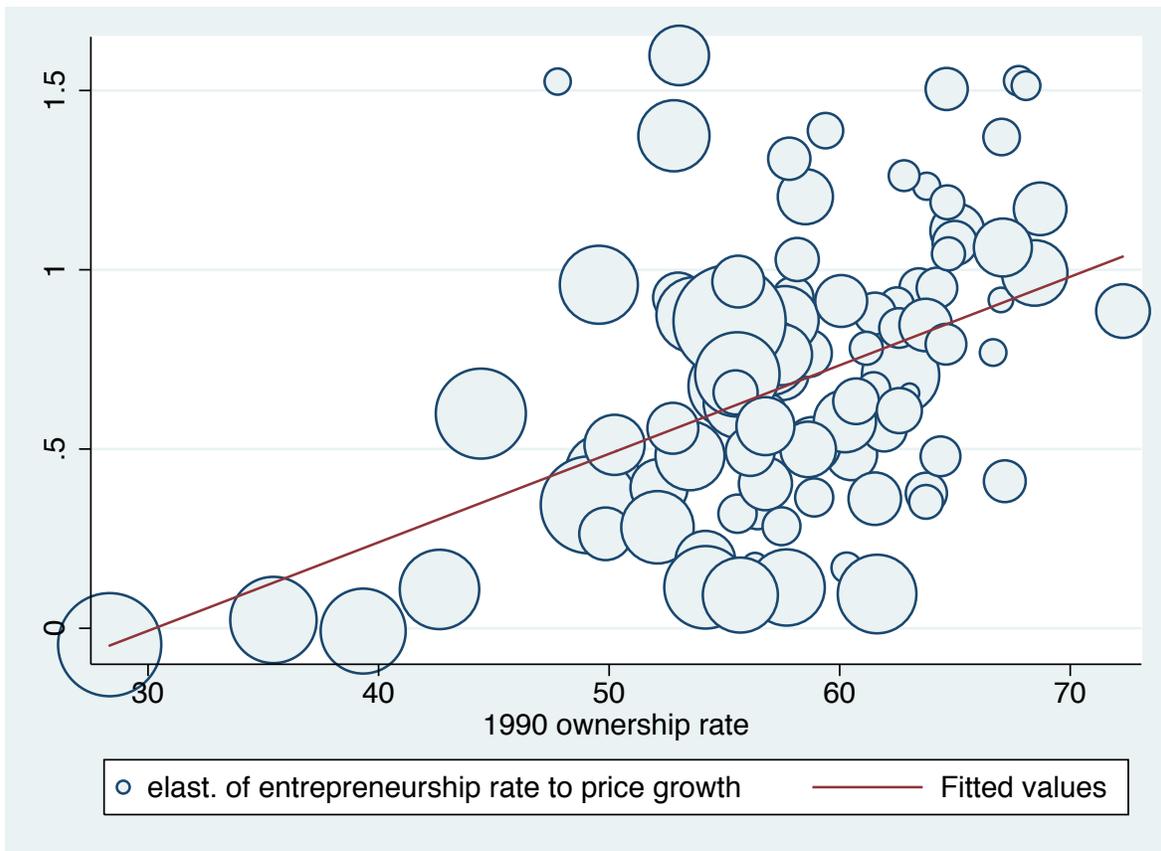


Figure 3: Elasticity of the region-level entrepreneurship rate (entrepreneurs as a fraction of the total population) to 5-year home price growth as a function of home ownership 8 years before the entrepreneurship rate is measured. Population-weighted regression at the department-level.

Table 1: Effect of being a Paris home owner during the 1993-1998 crash on several outcome variables (intensive margin). Being exposed to a collateral shock impairs existing entrepreneurs' ability to grow their business, to use debt financing, and employ workers. Profitability (EBIT) is not significantly affected, suggesting that the results do not stem from selecting particularly talented or untalented entrepreneurs into our sample.

	log Assets	log Sales	log Debt	# Employees	log EBIT
owner \times crash (no Fixed Effect)	-0.301*** (-3.23)	-0.268*** (-3.42)	-0.295* (-1.92)	-0.735** (-2.15)	-0.171 (-1.40)
owner \times crash (w/ Dep't-FE)	-0.377*** (-3.65)	-0.348*** (-3.97)	-0.402** (-2.48)	-0.886** (-2.19)	-0.141 (-0.97)
owner \times crash (w/ Region-FE)	-0.329*** (-3.62)	-0.281*** (-3.29)	-0.331** (-2.23)	-0.691* (-1.95)	-0.174 (-1.43)
Observations	3588	3713	3567	3778	2958

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Effect of 1993-1998 house price growth on several outcome variables of house-owning entrepreneurs (intensive margin). Privately owning collateralizable assets that appreciate in value improves existing entrepreneurs' ability to grow their business, to use debt financing, and employ workers. Profitability (EBIT) is not significantly affected, suggesting that the results do not stem from selecting particularly talented or untalented entrepreneurs into our sample.

	log Assets	log Sales	log Debt	# Employees	log EBIT
owner \times price growth (no Fixed Effects)	0.643*** (2.69)	0.834*** (4.42)	0.543 (1.57)	2.037** (2.53)	0.258 (0.86)
owner \times price growth (w/ Dep't-FE)	0.742*** (2.82)	0.883*** (3.97)	0.768** (2.11)	2.071** (2.50)	0.175 (0.52)
owner \times price growth (w/ Region-FE)	0.652*** (2.70)	0.782*** (3.68)	0.632* (1.84)	1.741** (2.30)	0.223 (0.73)
Observations	3588	3713	3567	3778	2958

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Effect of owning home collateral that appreciates in value on probability of becoming entrepreneur (extensive margin, individual-level). Columns (1) and (2) are probit regressions, columns (3) and (4) are linear regressions as a robustness check. (1) and (3) have department-level fixed effects and year-dummies only, (2) and (4) include further controls. Owning a house that appreciates in value makes it more likely that the owner decides to start a business.

Probability of becoming an entrepreneur	(1)	(2)	(3)	(4)
owner \times price growth	0.230*** (6.56)	0.0888** (2.30)	0.00950*** (7.25)	0.00654*** (5.80)
Observations	87123	87104	87123	87104

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Effect of house price growth on probability of becoming entrepreneur (extensive margin, individual-level). Columns (1) and (2) are probit regressions, columns (3) and (4) are linear regressions as a robustness check. (1) and (3) have department-level fixed effects and year-dummies only, (2) and (4) include further controls. Price growth in the region does not by itself make it more likely that individuals start businesses.

Probability of becoming an entrepreneur	(1)	(2)	(3)	(4)
price growth	-0.104*** (-2.87)	-0.0651 (-1.61)	-0.00377** (-2.67)	-0.00247* (-1.77)
Observations	87150	87131	87150	87131

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Effect of house price growth interacted with region-level ownership rates on number of firms created. Columns and (1) and (3) unweighted, (2) and (4) are population-weighted. Columns (1) and (2) have only year and department-dummies; columns (3) and (4) include controls. Column (5) includes department \times year-fixed effects. Column (6) excludes Paris as a robustness check. If more home owners enjoy price appreciation, more businesses are started.

Number of business starts	(1)	(2)	(3)	(4)	(5)	(6)
ownership rate	0.756***	0.747***	0.580**	0.407***	0.375***	0.395***
\times price growth	(5.65)	(7.56)	(2.84)	(3.46)	(4.87)	(3.23)
Observations	1494	1494	1494	1494	1494	1478

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Effect of house price growth interacted with region-level ownership rates on employment in newly created firms. Columns and (1) and (3) unweighted, (2) and (4) are population-weighted. Columns (1) and (2) have only year and department-dummies; columns (3) and (4) include controls. Column (5) includes department \times year-fixed effects. Column (6) excludes Paris as a robustness check. If more home owners enjoy price appreciation, more people work in startups.

Number of employees in new firms	(1)	(2)	(3)	(4)	(5)	(6)
ownership rate	1.018***	0.880***	0.670**	0.526***	0.661***	0.524***
\times price growth	(3.94)	(6.43)	(2.43)	(3.64)	(5.31)	(3.57)
Observations	1494	1494	1494	1494	1494	1478

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Effect of house price growth interacted with region-level ownership rates on fraction of entrepreneurs as share of total population. Columns and (1) and (3) un-weighted, (2) and (4) are population-weighted. Columns (1) and (2) have only year and department-dummies; columns (3) and (4) include controls. A larger share of the population decides to start businesses after house price growth affects a large share of the population.

Entrepreneurs as share of population	(1)	(2)	(3)	(4)
ownership rate	0.656**	0.958***	0.741***	0.572***
× price growth	(2.26)	(5.81)	(3.76)	(3.50)
Observations	1494	1494	1494	1494

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Effect of house price growth x ownership on fraction of employees in new firms as share of total population. Columns and (1) and (3) unweighted, (2) and (4) are population-weighted. Columns (1) and (2) have only year and department-dummies; columns (3) and (4) include controls. A larger share of the population works in startups after house price growth affects a large share of the population.

Employment in new firms as share of population	(1)	(2)	(3)	(4)
ownership rate	0.926**	1.281***	1.160**	1.034**
× price growth	(2.41)	(3.16)	(2.43)	(2.62)
Observations	1494	1494	1494	1494

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$