Entrepreneurship and gentrification*

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ABSTRACT: How do high-growth startups influence the neighborhoods in which they locate? Using data from the greater London area, we show a positive relationship between entrepreneurship and the subsequent growth of residential real estate prices in a neighborhood. These effects appear concentrated in places that had been cheaper prior to the entry of the entrepreneurs. The demographic composition of these communities also changes in a classic pattern of gentrification, with older, less educated residents being replaced by younger, more educated ones.

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Introduction

Silicon Valley has become notorious not only as a hotbed of entrepreneurship and innovation but also as the most expensive place to live in the United States (e.g., Metcalf, 2018).[1] Far from being mere coincidence, these two facts appear inextricably linked: People want to live in the Bay Area to participate in its dynamic economy. But the area has a limited supply of homes and apartments. Housing prices have risen as the strong demand for housing has exceeded its supply (Bayer, Ferreira, and McMillan, 2007; Rossi-Hansberg, Sarte, and Owens III, 2010).

This high cost of living has increasingly been seen as a source of social problems. It appears to reduce the dynamism of the local economy, by raising the costs of entry for entrepreneurs and of doing business for incumbents (Kwon and Sorenson, 2023). It may also increase inequality both across regions and within them by restricting access to the returns to innovation (Bloom, Hassan, Kalyani, Lerner, and Tahoun, 2021; Feldman, Guy, and Iammarino, 2021; Kwon and Sorenson, 2023). Income inequality, in turn, may foster further increases in rents and housing prices and rising rates of homelessness (Byrne, Henwood, and Orlando, 2021).

In many other places, however, this relationship between high-growth entrepreneurship and the attractiveness of a place has been seen as a solution. Startup communities have been credited with transforming neighborhoods, such as Kendall Square in Cambridge, Massachusetts, and Whitechapel in London – once low-rent districts – into hip communities with high-end bars, cafes, restaurants, and retail. Glass (1964)

[1] Zillow data (available at https://www.zillow.com/research/data/ identifies San Jose as the most expensive Metropolitan Statistical Area followed by San Francisco).

coined the term "gentrification" to describe these transformations. As lagging neighborhoods, in terms of average incomes and property prices, become attractive to the educated and the affluent, they experience reductions in crime and improvements in their schools and public services, as well as increasing property prices (Davis and Oakley, 2013; Guerrieri, Hartley, and Hurst, 2013; MacDonald and Stokes, 2020; Papachristos, Smith, Scherer, and Fugiero, 2011; Rocha, 2019).

Despite this general belief that high-growth entrepreneurship might increase property prices and transform neighborhoods, relatively little research, beyond some qualitative case studies, has examined these processes.

Entrepreneurship could increase the local demand for housing through multiple channels. Startups create jobs (Haltiwanger, Jarmin, and Miranda, 2013; Lawless, 2014). Founders and employees may therefore wish to live close to their workplaces. Startups may also increase the attractiveness of an area through the products and services that they provide, options for eating and entertainment (Florida, 2002; Glaeser, Kolko, and Saiz, 2001). Successful startups, moreover, bestow windfalls of wealth on their founders and employees, who may then spend more on housing. Only the last of these three channels has received much research attention (e.g., Butler, Fauver, and Spyridopoulos, 2019; Hartman-Glaser, Thibodeau, and Yoshida, forthcoming).

We examine these processes at the level of neighborhoods within the city of London—an international hub for high-growth entrepreneurship. We find a strong connection between high-growth entrepreneurship at the neighborhood level and residential real estate prices in those neighborhoods. Interestingly, this relationship appears strongest in neighborhoods that begin with lower property prices.

As the classic case studies of gentrification suggest, these price increases also appear associated with turnover in the residents of these neighborhoods. Older, less educated, blue-collar workers move out. Younger, more educated, white-collar employees replace them. The original residents of these places therefore may not benefit from the appreciation in property prices and the improvement in the attractiveness of neighborhoods associated with these revitalizations.

In terms of the channel responsible, our research design intentionally excludes wealth windfalls as a possible source of the effects. They instead appear driven by the increased availability of jobs in the area. We observe relatively little evidence supporting improvements in local amenities as the source of price increases. Indeed, high-tech entrepreneurship appears associated with a *decline* in the neighborhood share of employment in local services, an important component of local amenities.

Entrepreneurship, real estate prices, and residents

Despite the paucity of systematic research on the subject, few would question whether the founding and success of startups influence real estate prices. Silicon Valley, the poster child for technology entrepreneurship, has some of the highest housing costs in the United States. From the Netscape IPO in 1995 to the beginning of 2022, property prices more than quintupled according to the Case-Shiller Index of San Francisco home prices.[2] More broadly, theoretical perspectives on real estate prices suggest that property values should rise with the supply of high-income jobs in an

[2]The Case-Shiller index uses repeat sales of the same property to create its index, meaning that it adjusts for variation in the quality of the properties being sold in any given period.

area and the general attractiveness of a region (Roback, 1982).

At least three important questions nevertheless remain open. The first concerns the channels through which high-growth entrepreneurship might influence the demand for housing. The literature points to at least three possibilities: job creation, amenity upgrading, and wealth accumulation.

The second has to do with whether these processes also lead to changes in the communities affected by them. Although a rich literature on gentrification describes cases where communities have changed rapidly (e.g., Glass, 1964; Tuttle, 2020; Zukin, Trujillo, Frase, Jackson, Recuber, and Walker, 2009), often in concert with major development projects, little research has investigated whether these processes typically unfold and whether they might occur in response to other forms of economic stimuli.

A third finally pertains to the spatial scale at which these effects unfold. Research on the effects of entrepreneurship on communities has typically used the city, county or commuting area as the spatial unit of analysis. But these processes probably play out far more locally. People, for example, typically travel shorter distances for activities that they engage in on a regular basis (Sorenson, forthcoming). The value of proximity to jobs and amenities may therefore dissipate rapidly with distance.

Wealth accumulation

To date, most of the research related to these questions has focused on the wealth accumulation channel (Butler et al., 2019; Hartman-Glaser et al., forthcoming).

High-growth startups can create enormous amounts of wealth in short periods of

time. At the beginning of 2022, for example, more than 1,000 startups had achieved "unicorn" status (i.e. a private valuation in excess of $1 billion). This creation of wealth benefits not just the founders and early investors in these companies but also many of the employees. High-growth companies commonly pay their employees in part in equity. Tales of early employees who became millionaires abound.

But individuals often cannot access this wealth until the startup experiences a "liquidity event" (Kaplan, Violante, and Weidner, 2014). An initial public offering (IPO), for example, might allow owners to sell their shares to others on a public exchange. More commonly, an acquirer might buy a startup, allowing investors and insiders alike to cash out. These liquidity events then help large numbers of employees to buy their first homes or to trade up.

Hartman-Glaser et al. (forthcoming), for example, in a recent study of California-based companies, found that initial public offerings (IPOs) raised the real estate prices in the areas immediately surrounding the headquarters of firms going public on the order of 5%-6% (see also, Butler et al., 2019). Much of this effect occurs either just after firms announce that they plan to go public or just after the end of the "lock up" period, when insiders and employees can sell their shares.[3]

How far these effects should extend out from the headquarters of the firms experiencing these events probably depends on their nature. To the extent that the founders and employees continue to work for their companies, they would probably want to purchase places close to the company. Empirically, Hartman-Glaser et al. (forthcoming) find a near linear decline in the price effects with distance from head-

[3]When firms go public, the underwriters of initial offerings usually require insiders to hold their shares for at least 180 days after the event.

quarters – consistent with what one might expect if employees continued to commute to the same workplaces – with the effects being close to zero for locations 35 miles away from the headquarters.

But only a small proportion of startups ever generate these wealth effects. Even among startups funded by venture capitalists, the majority fail or fail to create enough value to produce windfalls of wealth for the employees. Even when they do, liquidity events might lag the founding of these companies by ten years or more.

By contrast, all startups could potentially influence real estate prices and neighborhood renewal through the other two channels, job creation and amenity upgrading, and those effects could begin to appear quite quickly.

Job creation

Startups stimulate local economies in large part through the creation of jobs. Haltiwanger et al. (2013), for example, reported that young companies, those in their first year of operations, could account for more than 100% of all net job creation in the United States. Older firms, by contrast, tend to shed jobs. Subsequent studies have shown that similar patterns exist in most European countries (de Wit and de Kok, 2014; Lawless, 2014).

Two lines of research, moreover, suggest that a small number of high-growth startups accounts for an unusually high proportion of this job creation. Most startups remain small. Henrekson and Johansson (2010), however, highlight that a small proportion – that they call "gazelles" – scale rapidly. In several of the studies that they review, fewer than five percent of startups account for more than 70% of job

creation. More recent research suggests that these firms differ at founding in a number of ways from those that fail to grow (e.g., Guzman and Stern, 2020; Lyonnet and Stern, 2022).

Parallel research on the effects of venture capital on regional economies similarly points to the importance of high-growth firms as engines of job creation. Based on the estimates from Samila and Sorenson (2011), for example, each additional venture-backed firm in a metropolitan area leads to more than 200 additional jobs on average. A large share of those jobs appear to come not from the startups themselves but from spillovers, as employees in these high-growth startups consume local goods and services (Kwon and Sorenson, 2023; Moretti, 2010).

The creation of jobs, in turn, raises the demand for housing. To the extent that housing supply remains constrained, whether due to natural limits on expansion, regulatory barriers, or simply the time required to build, this rising demand should lead to increased residential real estate prices (Bayer et al., 2007; Rossi-Hansberg et al., 2010). Consistent with this expectation, Greenstone and Moretti (2003), for example, find that the opening of a large manufacturing plant in a city raises real estate prices on the order of 1% to 2% (for evidence on the effects of large tech employers, see Freyd, 2022).

If job creation accounts for the rising demand for housing, moreover, this channel would also potentially predict substantial changes in the residential composition of neighborhoods. High-growth firms tend to hire more educated employees, as well as younger workers. If such individuals had not already dominated the demographics of the neighborhood, then an influx of them might change its character in many ways.

The spatial scale of these job creation effects, however, also remains an open question (cf. Manning and Petrongolo, 2017). Many people commute. In the United States, the average person spends almost 30 minutes traveling one-way (Burd, Burrows, and McKenzie, 2021). If that time involves simply walking, then it would suggest that the effects might spill out no more than a mile or two from the startups creating these jobs. But higher-speed modes, such as trains, buses, and automobiles, might lead any price and renewal effects to disperse across even larger spatial areas.

Amenity upgrading

High-growth entrepreneurship may also influence housing prices by raising the quantity and quality of local amenities. Amenities include a wide variety of features (Glaeser et al., 2001). Some relate to the natural environment. People, for example, might pay more for real estate in a place with good weather, a nice view, or a beach nearby (e.g., Benson, Hansen, Arthur L. Schwartz, and Smersh, 1998). Others, however, stem from the culture of a place and the aggregate preferences of the local population. Does a city have an orchestra or professional sports teams? Does a neighborhood have high-quality public schools? People value proximity and access to these services (e.g., Black, 1999; Blomquist, Berger, and Hoehn, 1988).

Florida (2002) has offered one of the most vivid and widely-discussed descriptions of this effect. He describes the changes in many neighborhoods associated with an initial influx of highly-educated creatives. Cool coffee shops open. Bookshops and boutique stores spring up. Restaurants appear with trendier dishes and cuisines. These local amenities then attract others to the neighborhood, raising property val-

ues. Although most of the evidence in favor of this hypothesis has been in the form of historical case studies, a recent paper by Kuang (2017), using data from Yelp, found systematic positive associations between the quantity and quality of restaurants in close proximity to a property and its sales price.

Whereas the job creation channel would predict changes in the composition of the local population, amenity upgrading may not. High-growth entrepreneurship might strongly stimulate the demand for a variety of services, from restaurants to shopping. But if these people commute to their jobs, then their employees might enjoy these services during the day even if a different set of people, local residents, benefit from them in the evenings and on weekends.

Different types of amenities will also vary in their catchment areas, and therefore in the spatial scales of any effects that they might have on real estate prices. People happily travel long distances – an hour or more – for events that they attend infrequently, maybe a few times per year or month. However, because they only consume them now and then, people may not value those amenities that highly.

By contrast, people probably value more highly the shopping and services that they frequent on a regular basis. However, much of the value of having these options comes from unplanned consumption, impulse purchases (Sorenson, forthcoming). The patronage of coffee shops, boutique shopping, and restaurants therefore remains quite local, near where people live and work.

Data

We investigate these processes using data on the greater London area. London has become a global hub for high-growth entrepreneurship, though more in high-value services than in high-tech. In 2021, the Global Entrepreneurship Network ranked it second, after Silicon Valley, in terms of the strength of its entrepreneurial ecosystem.[4]

Greater London represents more a set of geographically-proximate cities and towns that have expanded to meet each other than a place with a single center. Still, this metropolitan area, which encompasses more than 600 square miles (1570 km^2), has been defined as being a single labor market. It has the oldest subway system in the world, the Tube, and an extensive network of bus routes that allow for relatively easy movement across its entire expanse.

Given our interest in local communities, we would ideally use neighborhoods as the spatial unit of analysis. However, neighborhoods, though often understood by local residents, rarely have an official designation. People may also disagree on their boundaries. We therefore use the 2001 Census Wards, an administrative unit, as our spatial unit of analysis. In London, especially central London, many of these wards have their origins in the 19th century and designate places with central high streets – shopping districts – surrounded by residences.[5] They therefore often correspond closely to what residents would consider to be their neighborhoods. Greater London has 649 wards; the sample that we use for estimation includes 634 of them.[6]

[4]See `www.startupgenome.com` for the full list of ranked regions and for more details about these rankings.

[5]Wards also serve as the building blocks of the UK administrative geography, used to elect local government Councillors in the London boroughs.

[6]In the City of London, the center of the downtown business district, many wards have few

We compile our data set using information from four key sources: Crunchbase, the HM Land Registry, the Business Registry, and the 2001 and 2011 United Kingdom Census records.

We use Crunchbase as the source of our data on high-growth entrepreneurship. Crunchbase, founded in 2007, has become one of the leading providers of information on private companies, particularly technology companies. For our purposes, it usefully includes both companies that have already raised financial capital and those bootstrapping or still in search of funding. It records information about the firm's location, available at the postcode level, the founding year, and a description of the firm's business. It also provides some information about the characteristics of the founder, such as the person's country of birth.

We include in our analysis all private companies included in Crunchbase, founded between 2001 and 2016, with fewer than 50 employees and with postcode information that locates them in metropolitan London. We use the ONS National Postcode Directory (ONSDP) to allocate postcodes to 2001 Census Wards.[7] In total, 6,419 firms met these criteria.

Table 1 reports the ten most common activity groups, which account for almost 60% of total firms in the sample. These include high-value businesses such as financial services, information technology, app developers, data and analytics companies, internet services, and companies developing or using artificial intelligence. More than half of these firms have fewer than 10 employees.

housing units and fewer sales, meaning that we could not observe annual changes in housing prices for 15 of these wards.

[7]The ONSPD relates both current and terminated postcodes in the United Kingdom to a range of current statutory administrative, electoral, health, and other spatial units.

Figure 1 plots the average number of startups over this period by neighborhood. Most of these new ventures appeared in the western and northern parts of the city. East London has some hot spots: Hackney and Tower Hamlet, and further away from the city center in the boroughs of Havering, and of Barking and Dagenham. The southern part of the city also has some active areas: Lambeth, Southwark, and Wandsworth.

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Insert Figure 1 and Table 1 about here
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Data from the HM Land Registry then allows us to measure real estate prices. This registry covers all property sales in England and Wales from 1995 to the present. Each record reports the sale price stated on the transfer deed and the year in which the transaction took place, together with detailed geographical identifiers, including postcodes. We converted these prices to constant 2001 British pounds using the Retail Price Index (RPI).

Table 2 reports the average housing price level by decile, over the period 2001-2016, for all neighborhoods in greater London. These prices are highly skewed. Not only do the average prices become more spread out as one moves up the deciles but also the higher deciles have standard deviations far in excess of their means.

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Variables

Gentrification: Our preferred measure of real estate price appreciation, our main dependent variable of interest, calculates the seasonally-adjusted annual real growth rate in housing prices. In other words, after adjusting the raw sales prices for inflation and the month in which the sale occurred, it divides the sum of sales prices in one year by the sum in the previous year. Although this measure accounts for both inflation and seasonality, it does not adjust for potential year-to-year quality variation in the properties being sold (cf. Case-Shiller Index). To convert this ratio into a real growth rate in percentage points, it subtracts one from this ratio and multiplies the remainder by 100.

Figure 2 plots the average price appreciation from 2001-2016 by neighborhood. Average real housing price growth during this period ranges from 0.16% to about 5.8%. Although the neighborhoods with the highest appreciation are scattered across the city, they appear to occur in many of the same places that had high rates of high-growth entrepreneurship in Figure 1.

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Entrepreneurship: Our measure of entrepreneurial activity comes from the Crunchbase data. We sum the number of startups per neighborhood over three-year windows. Our primary measure counts the number of companies founded in years $t-1$ to $t-3$. To examine the lag structure of these effects, we also construct counts of companies founded in years $t-2$ to $t-4$ and years $t-3$ to $t-5$.

Neighboring entrepreneurship: To explore the spatial scale of these effects, we also aggregate counts in the surrounding neighborhoods (wards). We include these wards based on their distance from the centroid of the focal ward. One measure includes all startups in surrounding wards within 3km of the focal ward, the other all those within 5km.

Other outcomes: We use the Census data for 2001 and 2011 to construct a number of additional measures. *Share of white-collar* employment calculates the percentage of people residing in a neighborhood employed in white-collar occupations, including managers, directors, senior officials, professional and technical occupations. *Share blue-collar* meanwhile calculates a similar ratio for those employed in manufacturing and less-skilled services (e.g., machine operators, leisure services).

We also calculate ratios for the proportion of residents in various demographic segments: the young (18 to 34 years of age), black, and those with little education (ISCED Level 1 and 2). Finally, we collect information on housing tenure to construct a measure of the share of homeowners by neighborhood in 2001.

We use yearly data from the Business Register for the period 2001-2016 to look at the industry composition of employment within each neighborhood. We construct measures for the share of employment in high- and low-tech manufacturing and in knowledge-intensive and other services.[8]. We also construct measures for the share of employment in services related to consumer amenities (i.e. accommodation and food,

[8]We use the classifications developed by the UK Office for National Statistics (UK-ONS). For more details, see their website at https://www.ons.gov.uk/economy/nationalaccounts/uksectoraccounts/compendium/economicreview/april2018/examiningregionalgrossvalueaddedgrowthintheuk-1998to2016

arts, entertainment and recreational activities, and personal care services). Table 3 reports descriptive statistics for the variables used in our analysis.

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Price effects (Fixed effects)

Our baseline specification regresses real estate price appreciation at time t in neighborhood j on lagged entrepreneurship in that same neighborhood (see Equation 1). We include neighborhood fixed effects (γ_j) to account for unobserved factors that may influence the attractiveness of the neighborhood to both entrepreneurs and residents. Year fixed effects (δ_t), meanwhile, capture macroeconomic factors that might affect both entrepreneurship rates and property prices in all of London. The identification of our effect therefore comes from year-to-year variation in the number of startups in a neighborhood.

$$Gentrification_{jt} = \beta_0 + \beta_1 Entrepreneurship_{j,(t-1,t-3)} + \gamma_j + \delta_t + \epsilon_{jt} \tag{1}$$

We expect that neighborhoods experiencing higher firm entry in the past three years will have greater housing price appreciation, whether due to job creation or amenity upgrading. Our focus on early-stage startups largely eliminates wealth accumulation as a potential channel.

Table 4 reports the results of this baseline specification. Across all of the mod-

els entrepreneurship in a neighborhood predicts subsequent appreciation in residential real estate prices in that neighborhood. Column 1, for example, suggests that one startup raises annual real estate price appreciation by 0.013 percentage points.[9] Though smaller than the effects seen in response to the relocation of large employers (e.g., Greenstone and Moretti, 2003), this effect seems credible in terms of its magnitude when we consider that our variable captures the effects of small startups.

Columns 2 and 3 report the effects when we vary the time windows used to measure entrepreneurship. Whereas our baseline specification in column 1 looks at the number of new firms in a neighborhood between $t-1$ and $t-3$, columns 2 and 3 of Table 4 use the intervals $(t-2; t-4)$ and $(t-3; t-5)$, respectively. The size of the estimated coefficient declines with the length of the lag: a two-year lag reduces the coefficient to 0.011, a three-year lag to 0.009. This decaying effect may reflect firm failure. Our entrepreneurship measures do not incorporate information on firm failure but startups fail at a rate of roughly 10% per year. Any effects that startups have on the neighborhood may well dissipate with their disappearance.

Column 4 then introduces fixed neighborhood-specific trends. Since our baseline specification uses the change as a dependent variable, the neighborhood fixed effects in the first three models already capture differences in the average price trends across neighborhoods. The addition of a fixed trend term therefore captures second-order effects, neighborhood-specific acceleration or deceleration in price appreciation. Interestingly, though the coefficient for entrepreneurship remains stable, the

[9]Our results remain consistent when we account for potential outliers (see Table A.3 in the Appendix). Column 1 uses the logarithmic transformation of the number of firms, while column 2 drops the top 10% of the entrepreneurship distribution. In column 3, we regress entrepreneurship on housing price levels rather than growth.

constant becomes insignificant. These second-order neighborhood-specific trends appear to absorb significant variation in house price appreciation but these unobserved neighborhood determinants of prices nevertheless appear largely uncorrelated with entrepreneurship.

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To explore further the relationship between house prices and entrepreneurship, we examine whether the effect of firm entry varies across the distribution of initial prices. Columns 1 and 2 of Table 5 focus, respectively, on the bottom 10% and top 10% of neighborhoods, in terms of housing price levels in 2001. For this exercise, we normalize our measure of entrepreneurship so that one unit represents a one standard deviation increase in entrepreneurship. Entrepreneurship boosts housing price growth six times more in neighborhoods that had been in the bottom 10% of the housing price distribution in 2001 relative to neighborhoods in the top 10%. Columns 3 and 4 widen the bands to being the bottom 20% and top 20% neighborhoods, with similar results. Price appreciation therefore appears highly concentrated among neighborhoods that had been cheaper prior to our observation window.

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Table 6 finally explores the spatial scope of this price effect by estimating the extent to which these effects spill over to neighboring wards. We regress our measure

of real estate price appreciation in neighborhood j on entrepreneurship in the bordering areas within 3 km and 5 km from the focal neighborhood (columns 1 and 2, respectively). The effect of entrepreneurship on real estate prices dissipates rapidly with distance. We cannot distinguish the effects in neighboring areas from zero.

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Price effects (Instrumental Variable)

The primary threat to a causal interpretation of our fixed effects estimates comes from the possibility that the relationship between entrepreneurship and real estate prices could run in the opposite direction. That could happen for at least two reasons. On the one hand, rising real estate prices might provide financial capital that would-be entrepreneurs could access, increasing their odds of starting a firm. Indeed, research suggests that the causal arrow can run in this direction, though the estimated magnitudes of these effects have been small (Kerr, Kerr, and Nanda, 2022; Leth-Petersen, Nanda, and Jensen, forthcoming). On the other hand, entrepreneurs may feel that gentrifying neighborhoods provide more attractive business opportunities, either because these places offer attractive real estate prices or because entrepreneurs believe that the availability of interesting pubs, cafes, and shops in the area might help them to attract better employees (Florida, 2002). Silicon Roundabout, for example, on the outskirts of central London, appears to have pulled in entrepreneurs.

Although the lagged structure of our entrepreneurship measure helps to address this reverse causality concern, we also estimated a set of models using a Bartik-style instrument (Bartik, 1993, 2015; Goldsmith-Pinkham, Sorkin, and Swift, 2020). This instrument provides a ward-specific predictor of variation in entrepreneurship over time that should not influence property prices through any other channel.

We construct our instrument by building on two facts: (i) immigrants tend to have unusually high rates of entrepreneurship (e.g., Azoulay, Jones, Kim, and Miranda, 2022; Kerr and Kerr, 2020; Light and Sanchez, 1987), and (ii) they tend to settle in 'enclaves' where others from their country of origin already live (Light, 1972; Ottaviano and Peri, 2006; Wilson and Portes, 1980). We calculate our instrument by interacting the share of the population by ethnic group g and neighborhood j in 1991 with the growth rate in the number of entrepreneurial firms in the entire city of London with founder ethnic group g in year t (see equation 2).

$$Pred\ Entr_{jt} = \sum_{jt} (Pop\ Sh_{g,j,1991} \times Ethnic\ Entr_{g,t}) \tag{2}$$

The instrument allocates entrepreneurial firms to neighborhoods assuming that individuals of a given ethnicity more commonly set up their companies in neighborhoods with more residents from their same ethnic group. To avoid the possibility that the migration of immigrants within London might shift with real estate rates, it fixes the ethnic composition of neighborhoods at their 1991 levels. By construction, this predicted change therefore should not depend on any neighborhood-specific shocks during our observation window (Goldsmith-Pinkham et al., 2020).

Table 7 reports the first and second stages for this instrumental variable regres-

sion. The first stage, reported in Column 2, predicts the potentially endogenous variable in the expected direction. The Kleibergen-Paap F statistic also suggests that the strength of the first stage exceeds that required to ensure that the instrumental variable estimates have no more than 10% of any bias in the naive regression.

Column 1 details the second-stage estimates. The size of the coefficient increases but so too do the standard errors. In fact, the 95% confidence intervals for the fixed effects estimates and the instrumental variables estimates overlap, so we cannot conclude that they differ in magnitude. That said, part of the large point estimate probably stems from the fact that immigrant entrepreneurs disproportionately locate their ventures in lower cost places (meaning that the IV estimates more heavily weight places with larger effects).

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Demographic change

Gentrification typically involves not just changes in the property prices and amenities in a neighborhood but also in the composition of the people living there. Areas undergoing these changes lose their residents from lower socioeconomic strata, replaced by an influx of those with higher incomes and assets. Using census data, we explore whether we also see these demographic shifts in response to entrepreneurship.

Table 8 reports estimates of the shares of a variety of demographic measures regressed on entrepreneurship with neighborhood and year fixed effects. Columns 1

and 2 report the relationships to the share of white- and blue-collar jobs. Columns 3 and 4 detail the partial correlations between entrepreneurship and the percentage of young people and the share of black residents, respectively. The final column estimates the relationship between high-growth entrepreneurship and the proportion of less-educated residents in the neighborhoods. We log the entrepreneurship measure.

Neighborhoods that experience higher rates of high-tech entrepreneurship shift toward having more white-collar employees as residents. They also attract younger and more diverse residents.

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Table 9 delves deeper into these demographic shifts by estimating the changes in white- and blue-collar employment in levels rather than as proportions of the population. The estimates suggest that each high-tech startup adds, on average, 13.8 white-collar jobs to the neighborhood but reduces the number of residents with blue-collar jobs by 3.2. The change in white-collar employees seems consistent with prior research suggesting that many of the jobs associated with entrepreneurial entry appear in incumbent firms (Moretti, 2010; Samila and Sorenson, 2011).

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Insert Table 9 about here
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Table 10 examines changes in industry employment. Consistent with employees moving into the neighborhood, high-growth entrepreneurship primarily increases the

share of individuals employed in knowledge-intensive services. If high-growth entrepreneurship led to an expansion in the amenities in the area, that would probably increase the proportion of individuals employed in other services. But our estimates show no systematic relationship between entrepreneurship and other services, even when focusing specifically on employment in industries that provide these services (e.g., bars and restaurants).

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Insert Table 10 about here

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Although much of the recent qualitative literature has portrayed these demographic shifts as problematic, disrupting communities, in a purely economic sense, who gains and who loses from these dynamics depends on a number of factors. The replacement of less-educated, blue-collar residents with more-educated, white-collar one may benefit the former residents as well if they had owned their houses and had been able to profit from the rising real estate values.

We gain some insight into this welfare question by examining the effect of entrepreneurship on gentrification as a function of the distribution of home ownership in 2001. Table 11 reports models for neighborhoods in the bottom and top 10% of home ownership. The effect of entrepreneurship on housing prices appears stronger in neighborhoods at the the lower end of the ownership distribution, in other words, places where most people rent. Given the low ownership rates in these places, we suspect that those leaving these neighborhoods probably did not benefit from the gentrification. More likely, they left because they could not afford the rent anymore.

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Discussion

Case studies have pointed to entrepreneurship as a possible path to urban renewal (Breznitz, 2021; Case, 2022; Florida, 2002). In many ways, this policy argument seems well supported: A large body of research, for example, supports the idea that entrepreneurship stimulates economic growth. Countries and regions with more startups, particularly high-growth startups, have higher rates of economic growth and employment, and higher levels of income and wealth (e.g., van Praag and Versloot, 2007; van Stel, Carree, and Thurik, 2005; Wong, Ho, and Autio, 2005). Cities with higher levels of entrepreneurial activity similarly enjoy faster economic and population growth (e.g., Acs and Armington, 2004; Audretsch and Keilbach, 2008; Samila and Sorenson, 2011).

But open questions remain. How broad are these economic benefits? Do they accrue at the level of a state, a commuting region, or a neighborhood? To what extent does the wealth created by these startups spill over to the rest of the community?

We explore these questions by examining the effects of high-growth entrepreneurship on gentrification in the greater London area. On average, each startup predicted a 0.013 percentage-point increase in real property price appreciation over the subsequent three years (i.e. a cumulative increase of 0.04 percentage points). We find that entrepreneurship leads to real growth in real estate prices in the neighborhoods

in which startups locate, particularly for neighborhoods that began with relatively lower property prices. Although one might worry that causality runs in the opposite direction – that trendy places attract entrepreneurs – these results hold even when we estimate the effects using an instrumental variable.

Although these effects may sound small, they seem realistic in scale given the number of people that these startups employ on average. Also, keep in mind that neighborhoods vary dramatically in their numbers of startups. The point estimates suggest that the most entrepreneurial neighborhood would experience annual real price increases roughly 2.6 percentage points higher than the least entrepreneurial one.

We also find that entrepreneurship leads to demographic shifts in these neighborhoods. Older, blue-collar residents leave. Those replacing them are younger, more educated, and more commonly have a white-collar job.

Two channels might account for these effects. On the one hand, the jobs created by startups – both directly and through spillovers to other employers – may increase the demand for housing in the immediate vicinity.

On the other hand, startups might spur an upgrading of the local amenities. Florida (2002) has prominently argued that the creative class – artists, entrepreneurs, and musicians – move into depressed areas in search of cheaper real estate. Their entry raises the demand for coffee shops, retail, and restaurants, which, in turn, attracts the educated and affluent, raising real estate prices.

Our results point strongly to job creation as the initiator of any such virtuous cycles. Entrepreneurship raises aggregate employment in the neighborhood, not in

the types of service jobs that provide many local amenities but in knowledge-intensive service. The demographic shifts – to more younger and more educated individuals – also seem more consistent with startup employees moving into these neighborhoods than with an upgrading of amenities generally attracting the more affluent.

Overall, the results also suggest that the benefits of entrepreneurship do not disperse broadly into the economy. Instead, they appear highly localized. We see no evidence of price effects beyond the neighborhoods receiving startups, even in places immediately adjacent to them. Those priced out, moreover, had probably been renters, meaning that they would not have even benefited from the price appreciation in the properties in which they had been living.

We therefore identify another channel through which entrepreneurship may contribute to rising inequality. Places with higher levels of entrepreneurship also have higher levels of income inequality (Halvarsson, Korpi, and Wennberg, 2018; Kwon and Sorenson, 2023; Sørensen and Sorenson, 2007). Entrepreneurship may even lead to higher income inequality among existing firms, as incumbents fend off offers from startups (Castellaneta, Conti, and Kacperczyk, 2019). Although real estate offers a plausible channel by which the some of these gains could spill over to the rest of the community, instead these price effects may simply exacerbate inequality. Even within neighborhood with startups, the wealth gains probably accrued more to landlords than to residents.

Rising real estate prices also connect to one of the longer-run downsides of entrepreneurship. Kwon and Sorenson (2023) argue that rising real estate prices and personnel costs in high-tech hubs raise the costs for all employers. In a dynamic

similar to the Dutch Disease, this Silicon Valley Syndrome reduces the competitiveness of manufacturing and tradable services, leaving economies increasing fragile and concentrated on the high-tech sector.

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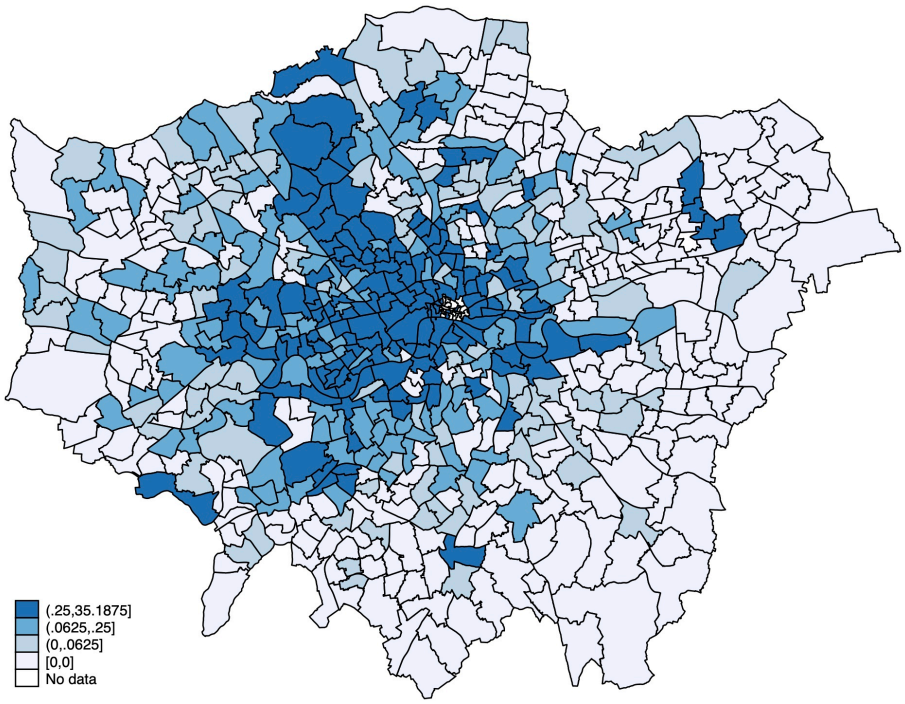
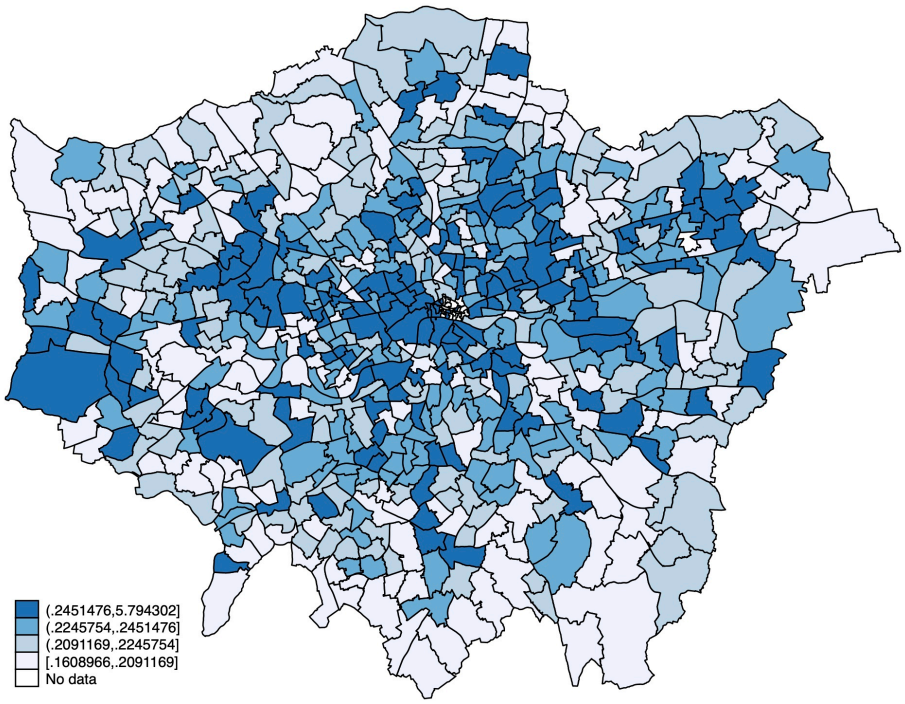
Figure 1: Entrepreneurship - 2001/2016



Notes: Average number of firms by neighborhood j

Figure 2: Gentrification - 2001/2016



Notes: Yearly growth rate in housing prices by neighborhood j

Table 1: Top 10 types of firms

Business Activity
Financial services
Commerce and Shopping (also online)
Advertising services
Information technology
App Developers
Data and Analytics
Publishing
Artificial Intelligence
Education

Notes. Top 10 business activities in the metropolitan area of London by number of startups. Years 2001-2016.

Table 2: Housing price level deciles

Decile	Avg Price	Std Dev
1st	252,368	148,696
2nd	302,924	194,321
3rd	344,314	231,649
4th	386,481	278,800
5th	435,456	396,112
6th	496,849	675,095
7th	578,761	943,923
8th	702,495	148,7378
9th	939,467	2,326,942

Notes. Housing prices by decile in the metropolitan area of London. Years 2001-2016.

Table 3: Descriptive statistics

Variable	N	$Mean$	SD	Min	Max
Price growth	10,141	0.257	1.091	0.896	7.054
Price level (2001)	10,141	289771	161078	118080	1531736
Entrepreneurship	10,141	1.626	8.356	0	204
Entrepreneurship (3 Km)	10,141	1.022	5.873	0	173
Entrepreneurship (5 Km)	10,141	1.451	5.007	0	101.33
Sh. Homeowners (2001)	10,097	0.580	0.204	0.010	0.944
Sh. White Collar	1,262	0.500	0.146	0.213	0.895
Sh. Blue Collars	1,262	0.283	0.103	0.0340	0.568
Sh. Young (18-34)	1,262	0.453	0.080	0.275	0.768
Sh. Black	1,262	0.114	0.097	0	0.547
Sh. Low-educated	1,262	0.468	0.149	0.076	0.082
Sh. High-tech Man	10,110	0.011	0.037	0	0.763
Sh. Low-tech Man	10,110	0.030	0.042	0	0.626
Sh. Knowledge-intensive	10,110	0.174	0.117	0	0.806
Sh. Other services	10,110	0.698	0.131	0.125	0.974
Sh. Amenity services	10,110	0.118	0.072	0.004	0.751

Notes. Housing prices data come from the Land Registry 2001-2016, entrepreneurship data come from Crunchbase 2001-2016, demographic data come from the UK censuses 2001 and 2011, employment by industry data from the Business Registry 2001-2016.

Table 4: Entrepreneurship and house price growth (Fixed effects)

	(1)	(2)	(3)	(4)
DV: *Real price growth*				
Entrepreneurship (t-1;t-3)	0.0133***			0.0116**
	(0.004)			(0.005)
Entrepreneurship (t-2;t-4)		0.0113***		
		(0.004)		
Entrepreneurship (t-3;t-5)			0.009**	
			(0.003)	
Constant	0.0693***	0.0652***	0.0662***	0.0100
	(0.013)	(0.014)	(0.014)	(0.013)
Neighborhood-years	10,141	10,141	10,141	10,141
R-squared	0.427	0.425	0.424	0.493
Neighborhood FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Neighborhood fixed trends	No	No	No	Yes

Notes. Robust standard errors, clustered by ward (neighborhood), in parentheses. The sample includes 634 wards observed over the period 2001-2016 (Dowgate has missing housing prices for 2009, 2010 and 2013). $^{*}p < .10$; $^{**}p < .05$; $^{***}p < .01$.

Table 5: Entrepreneurship and house price growth for neighborhoods with highest/lowest price levels in 2001

DV: *Real price growth*	(1) Bottom 10%	(2) Top 10%	(3) Bottom 20%	(4) Top 20%
Entrepreneurship (t-1;t-3)	0.363***	0.061***	0.306***	0.069***
	(0.144)	(0.028)	(0.127)	(0.025)
Constant	0.163***	0.104*	0.151***	0.078**
	(0.025)	(0.056)	(0.021)	(0.031)
Neighborhood-years	1,024	1,005	2,032	2,013
R-squared	0.934	0.142	0.820	0.199
Neighborhood FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes. Robust standard errors, clustered by ward (neighborhood), in parentheses. The sample includes 64 neighborhoods observed over the period 2001-2016 in Column 1, 63 in column 2, 127 in column 3 and 126 in column 4 (Dowgate has missing housing prices for 2009, 2010 and 2013 in Columns 2 and 4). $^{*}p < .10$; $^{**}p < .05$; $^{***}p < .01$.

Table 6: Spatial spillovers: Entrepreneurship and house price growth for adjacent neighborhoods

	(1)	(2)
DV: *Real price growth*		
Entrepreneurship	0.0120***	0.0123***
	(0.004)	(0.005)
Neighboring Entrepreneurship (3 Km)	0.008	
	(0.007)	
Neighboring Entrepreneurship (5 Km)		0.007
		(0.005)
Constant	0.065***	0.065***
	(0.014)	(0.013)
Neighborhood-years	10,141	10,141
R-squared	0.428	0.427
Neighborhood FE	Yes	Yes
Year FE	Yes	Yes

Notes. Robust standard errors, clustered by ward (neighborhood), in parentheses. The sample includes 634 wards observed over the period 2001-2016 (Dowgate has missing housing prices for 2009, 2010 and 2013). $^{*}p < .10$; $^{**}p < .05$; $^{***}p < .01$.

Table 7: Entrepreneurship and house price growth (Instrumental variable)

	(1)	(2)
DV:	*Real price growth*	*Entrepreneurship*
Entrepreneurship	0.0481***	
	(0.0116)	
Pred. Entr.		7.8725***
		(1.1875)
Constant	0.9115***	3.3955***
	0.0458	(0.3938)
Neighborhood-years	10,141	10,141
Neighborhood FE	Yes	Yes
Year FE	Yes	Yes
K-P Wald F Stat		10.72

Notes. Robust standard errors, clustered by ward (neighborhood), in parentheses. The sample includes 587 neighborhoods (due to missing records for 46 neighborhoods in 1991) observed over the period 2001-2016. $^{*}p < .10$; $^{**}p < .05$; $^{***}p < .01$.

Table 8: Entrepreneurship and neighborhood demographic composition

	(1) Share White collar	(2) Share Blue collar	(3) Share Young	(4) Share Black	(5) Share Low Educ
Entrepreneurship (log)	0.006^{***}	-0.005^{***}	0.004^{**}	-0.004^{***}	-0.003^{*}
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Constant	0.497^{***}	0.271^{***}	0.450^{***}	0.106^{***}	0.301^{***}
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Neighborhood-years	1,262	1,262	1,262	1,262	1,262
R-squared	0.015	0.431	0.015	0.203	0.911
Neighborhood FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Notes. Robust standard errors, clustered by ward (neighborhood), in parentheses. The sample includes 631 neighborhoods observed in 2001 and 2011. $^{*}p < .10$; $^{**}p < .05$; $^{***}p < .01$.

Table 9: Entrepreneurship and neighborhood job composition

	(1)	(2)
DV:	White collar jobs	Blue collar jobs
Entrepreneurship	13.79***	−3.164**
	(5.266)	(1.535)
Constant	2.624***	1.394***
	(14.85)	(7.677)
Neighborhood-years	1,264	1,264
R-squared	0.463	0.627
Neighborhood FE	Yes	Yes
Year FE	Yes	Yes

Notes. Robust standard errors, clustered by ward (neighborhood), in parentheses. The sample includes 631 neighborhoods observed in 2001 and 2011. $^{*}p < .10$; $^{**}p < .05$; $^{***}p < .01$.

Table 10: Employment and neighborhood industry employment

	(1) High-tech Man	(2) Low-tech Man	(3) Know-intense Serv	(4) Other Serv	(5) Amenity Serv
Entrepreneurship (log)	0.000	0.000	0.013***	−0.013***	−0.002
	(0.000)	(0.000)	(0.002)	(0.003)	(0.002)
Constant	0.021***	0.045***	0.175***	0.674***	0.114***
	(0.001)	(0.001)	(0.003)	(0.004)	(0.002)
Neighborhood-years	10,110	10,110	10,110	10,110	10,110
R-squared	0.072	0.105	0.038	0.043	0.015
Neighborhood FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Notes. Robust standard errors, clustered by ward (neighborhood), in parentheses. The sample includes 630 neighborhoods observed between 2001 and 2016 (Castle Baynard and Dowgate do not have employment information). $^{*}p < .10$; $^{**}p < .05$; $^{***}p < .01$.

Table 11: Entrepreneurship and house price growth for neighborhoods with highest/lowest ownership levels in 2001

DV: *Real price growth*	(1) Bottom 10%	(2) Top 10%	(3) Bottom 20%	(4) Top 20%
Entrepreneurship	0.008***	0.021	0.009***	−0.015
	(0.003)	(0.016)	(0.003)	(0.011)
Constant	0.026	0.076***	0.030	0.077***
	(0.025)	(0.056)	(0.021)	(0.031)
Neighborhood-years	1,024	1,008	2,032	2,016
R-squared	0.569	0.963	0.607	0.962
Neighborhood FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes. Robust standard errors, clustered by ward (neighborhood), in parentheses. The sample includes 64 neighborhoods observed over the period 2001-2016 in Column 1, 63 in column 2, 127 in column 3 and 126 in column 4. $^{*}p < .10$; $^{**}p < .05$; $^{***}p < .01$.

A Appendix

A.1 Additional information on *Crunchbase* data

To construct our sample of startups, we extracted information on 11,726 private companies with fewer than 50 employees founded in the metropolitan area of London between 2001 and 2016.

Out of these 11,726 firms, 4,674 records have missing postcode information (about 40%). To allocate postcodes to the corresponding 2001 Census Wards, we used the *ONS National Postcode Directory (ONSPD)*. After cleaning incomplete and misspelled postcodes we end up with a final sample of 6,419 firms.

Although one might worry that these firms differ systematically from those included in our sample, we compared them to our observed sample on two dimensions that might inform their location decisions: type of business and founder country of origin. Table A.1 reports the number and percentage of firms by type of business. Overall, the two subsets appear very similar, though *Artificial Intelligence and Data Analytics* startups have a somewhat higher probability of having detailed address information and *Retail and Consumer Goods* startups have a somewhat lower probability. *Crunchbase* reports the country of origin for 8,322 founders (1,889 for firms without postcode information). Table A.2 indicates that the two subsets also appear very similar in terms of country of origin.

Table A.1: Missing information by business type

	Post code		**Missing post code**	
Main Activity	N	%	N	%
Admin, Fin, and Prof Serv	1763	25.6	1182	25.9
Retail and Consumer	1229	17.9	911	19.9
Computer and IT	1147	16.5	762	16.6
AI and Data Analytics	1052	11.0	597	10.2
Energy, Educ, Military & Health	586	8.5	320	7.0
Community and Lifestyle	476	6.9	334	7.3
Media and Communication	431	6.3	372	8.1
Science and Biotech	97	1.4	33	0.7
Agriculture and Mining	39	0.6	17	0.4
Transportation	32	0.5	23	0.5
Manufacturing	27	0.4	18	0.4
Total	6,879	100	4,569	100

Table A.2: Missing information by founder region

	Post code		**Missing post code**	
Region	N	%	N	%
UK	5,296	82.2	1544	81.7
EU-27	513	8.0	147	7.8
USA & Canada	305	4.7	92	4.9
Russia	101	1.6	23	1.2
Other EU	94	1.5	38	2.0
Asia	48	0.7	16	0.8
Australia	33	0.5	7	0.4
Africa	23	0.4	8	0.4
South and Central America	20	0.3	14	0.7
Total	6,433	100	1,889	100

A.2 Additional tables

Table A.3: Robustness checks on price effects

	(1)	(2)	(3)
DV:	Real price growth	Real price growth	House price levels
Entrepreneurship (log)	0.119***		
	(0.0387)		
Entrepreneurship		0.0507**	35886.2***
		(0.0250)	(10450.58)
Constant	0.0337	0.0337	234817.3
	(0.0246)	(0.0331)	(25735.28)
Neighborhood-years	10,141	10,043	10,141
Neighborhood FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes. Robust standard errors, clustered by ward (neighborhood), in parentheses. The sample includes 634 wards observed over the period 2001-2016 (Dowgate has missing housing prices for 2009, 2010 and 2013). In column 2, we exclude wards in the top 10% of the price distribution. $^{*}p < .10$; $^{**}p < .05$; $^{***}p < .01$.

Table A.4: Entrepreneurship and house price growth by neighborhood accessibility

	(1)	(2)
DV:	Tube station	No tube station
Entrepreneurship	0.013**	0.012***
	(0.005)	(0.002)
Constant	0.065**	0.073***
	(0.031)	(0.007)
Observations	3,021	7,120
R-squared	0.258	0.761
Neighborhood FE	Yes	Yes
Year FE	Yes	Yes

Notes. Robust standard errors, clustered by ward (neighborhood), in parentheses. The sample includes 189 and 445 neighborhoods in column 1 and 2 respectively, observed over the period 2001-2016 (Dowgate, which has a station, has missing housing prices for 2009, 2010 and 2013). $^{*}p < .10$; $^{**}p < .05$; $^{***}p < .01$.