# Entrepreneurial Spillovers Across Coworkers

## Online Appendix

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March 31, 2025

## OA.1 Implications of using a subset of states

Due to data limitations, this paper exclusively uses 18 states: AK, AZ, CA, CO, FL, ID, IL, IN, KS, LA, MD, MO MT, NC, OR, WA, WI, and WY. This generates the potential for measurement error, as I may misclassify some entrepreneurs. Specifically, if an individual in my sample becomes an entrepreneur in the future *outside* of my sample of states, I will incorrectly identify them as a non-entrepreneur. At the same time, if some coworkers were entrepreneurs in the past outside of my sample of states, I will incorrectly identify them as non-entrepreneurs.

In this section, I illustrate in a stylized setting that this will likely attenuate my results. To do this, consider a univariate setting, in which I am interested in estimating the relationship between individual $i$'s future entrepreneurship $y_i$ and their coworkers' $j \in J$ past entrepreneurship $x_{ij}$. Namely, I am interested in recovering an estimate for $\beta$ in the following relationship:

$$y_i = \beta x_i + \varepsilon_i,$$

where $x_i$ is the share of individual $i$'s coworkers with past entrepreneurship, i.e.

$$x_i = \frac{1}{\sum_{j \in Jin} 1} \sum_{j \in J} x_{ij}.$$

$y_i$ and $x_{ij}$ are binary variables reflecting the *true* entrepreneurship of individuals and their coworkers. Given this relationship and true entrepreneurship rates, the estimate of $\beta$ is given by

$$\hat{\beta} = \frac{cov(x_i, y_i)}{var(x_i)}$$

Suppose, due to migration in and out of my sample, I misclassify some workers. That is, suppose I observe

$$\tilde{y}_i = \begin{cases} y_i & 1 - m_y, \text{ i.e., do not move} \\ 0 & m_y, \text{ i.e., do move} \end{cases}$$

and

$$\tilde{x}_{ij} = \begin{cases} x_{ij} & 1 - m_x, \text{ i.e., do not move} \\ 0 & m_x, \text{ i.e., do move} \end{cases}$$

where $m_y$ and $m_x$ reflect the probability of individuals moving states (out of my sample) in the future and coworkers moving states (into my sample) in the past, respectively.[1]

As before, I take the average across coworkers, such that the observed share of coworkers with entrepreneurial experiences for individual $i$ is

$$\tilde{x}_i = \frac{1}{\sum_{j \in Jin} 1} \sum_{j \in J} x_{ij}.$$

Given the observed $\tilde{y}_i$ and $\tilde{x}_i$, I estimate a relationship between coworkers' and individual's entrepreneurship, summarized by $\hat{\tilde{\beta}}$, from the regression

$$\tilde{y}_i = \tilde{\beta}\tilde{x}_i + \tilde{\varepsilon}_i.$$

As I show below, $\hat{\tilde{\beta}}$ is not an unbiased estimate of $\beta$. Instead, there is likely attenuation bias. To see this, I consider the problem in two steps.

**Step 1: Deterministic moves** First, suppose migration in and out of my sample of states is deterministic (i.e., non-random). In expectation, this simply shifts downwards the observed entrepreneurship rates. I.e.,

$$\mathbb{E}[\tilde{y}_i] = (1 - m_y) y_i$$

and

$$\mathbb{E}[\tilde{x}_i] = (1 - m_x) x_i.$$

[1] For reference, according the U.S. Census Bureau, approximately 9% of Americans moved states between 1995 and 2000 (https://usa.ipums.org/usa/resources/voliii/pubdocs/2000/c2kbr-28_paper_states.pdf.

In this case, the estimate of $\hat{\tilde{\beta}}$ is given by

$$\hat{\tilde{\beta}} = \frac{cov(\tilde{x}_i, \tilde{y}_i)}{var(\tilde{x}_i)} = \frac{cov\big((1-m_x)x_i, (1-m_y)y_i\big)}{var\big((1-m_x)x_i\big)} = \frac{(1-m_x)(1-m_y)cov(x_i, y_i)}{(1-m_x)^2 var(x_i)} = \frac{(1-m_y)}{(1-m_x)}\frac{cov(x_i, y_i)}{var(x_i)},$$

which has probability limit

$$\text{plim } \hat{\tilde{\beta}} = \frac{(1-m_y)}{(1-m_x)}\beta.$$

In other words, if migration is deterministic, the estimated coefficient is biased as a function of the relative migration of individuals and coworkers. If both groups migrate in and out of the sample at the same rates (i.e., $m_y = m_x$), then $\hat{\tilde{\beta}}$ is an unbiased estimate of $\beta$.

**Step 2: Add classical measurement error** Second, consider the more realistic scenario in which migration is not deterministic but rather itself a random variable, with each individual facing a random draw (assumed to be iid) of moving with probability $m_x$ or $m_y$. In this case, the observed entrepreneurship for individuals is the same, in expectation, as in step 1. However, the observed average entrepreneurship for coworkers now includes additional noise, as we are average across coworkers. We can summarize this by noting that the observed entrepreneurship of coworkers can now be described as

$$\tilde{x}_i^c = \frac{1}{\sum_{j \in Jin} 1} \sum_{j \in J} \tilde{x}_{ij} = (1-m_x)x_i + \eta = \tilde{x}_i + \eta, \qquad \eta \sim N(0, \sigma_\eta^2)$$

where the $c$ superscript denotes the fact that this noise adds classical measurement error to the problem. In this case, the regression I estimate is given by

$$\tilde{y}_i = \tilde{\beta}^c \tilde{x}_i^c + \tilde{\varepsilon}_i^c.$$

The estimate of $\hat{\tilde{\beta}}^c$ is given by

$$\hat{\tilde{\beta}}^c = \frac{cov(\tilde{x_i^c}, \tilde{y}_i)}{var(\tilde{x_i^c})} = \frac{cov(\tilde{x}_i + \eta, \tilde{\beta}\tilde{x}_i + \tilde{\varepsilon}_i)}{var(\tilde{x}_i + \eta)} = \frac{\tilde{\beta} var(\tilde{x}_i)}{var(\tilde{x}_i) + var(\eta)},$$

which has probability limit

$$\text{plim } \hat{\tilde{\beta}}^c = \frac{var(\tilde{x}_i)}{var(\tilde{x}_i) + var(\eta)}\tilde{\beta} = \frac{(1-m_y)}{(1-m_x)}\frac{(1-m_x)^2 var(x_i)}{(1-m_x)^2 var(x_i) + var(\eta)}\beta = \theta\beta.$$

If $\theta \neq 1$, $\hat{\tilde{\beta}}^c$ is a biased estimate of the true relationship $\beta$. Note that this additional classical measurement error attenuates the estimate we get under the deterministic migration step 1; i.e., like standard classical measurement error, we have attenuation bias — but, that attenuation bias is *relative* to the biased estimate in step 1.

A sufficient but not necessary condition for attenuation relative to the true relationship $\beta$ is the following: if individuals are more likely to move in the future than coworkers were in the past, then $\hat{\tilde{\beta}}^c$ is an attenuated estimate of $\beta$. In other words:

$$m_y \geq m_x \Rightarrow \frac{(1-m_y)}{(1-m_x)} \leq 1 \Rightarrow \frac{(1-m_y)}{(1-m_x)}\frac{(1-m_x)^2 var(x_i)}{(1-m_x)^2 var(x_i) + var(\eta)}\beta \leq \beta.$$

This is likely to be true; many of the coworkers I measure in 2004 have been at their firms for several years (i.e., have not recently moved into the state), but individuals may move more freely going into the future. This is supported by summary statistics in Table 1. Namely, on average, workers in 2004 have been at their firm for 4 years; but, they on average will only be their firm for another 3 years. This asymmetry appears as well amongst the individuals I label as future entrepreneurs: in this population, workers have been at their firm on average for 3.5 years but will only stay for another 1.6.

### OA.2 Conceptual framework in detail: Multidimensional spillovers

This section shows the full details of the conceptual framework underlying the proposed mechanisms in the paper. When individuals work with former entrepreneurs, they may experience multiple dimensions of entrepreneurial spillovers, and the ultimate implications of these spillovers

depend on *what* these coworkers can teach them. Here, I present a conceptual framework in which individuals may learn from former entrepreneurs both how to be more **productive** entrepreneurs, e.g., by learning entrepreneurial skills, and to have lower **entrepreneurial costs**, e.g., by learning institutional knowledge. On the margin, both of these types of spillovers encourage more entrepreneurship (i.e., have positive *extensive margin* effects), but only productivity spillovers lead to productivity gains (i.e., have positive *intensive margin* effects).

These patterns mean that I can empirically measure the presence of entrepreneurial spillovers by studying the extensive margin, leveraging variation in exposure to entrepreneurial coworkers (Section 3). Then, I can disentangle the relative strengths of the spillovers to productivity and cost by studying the intensive margin, leveraging variation in exposure to *productive* entrepreneurial coworkers (Section 5).

### OA.2.1 Individuals choose between wage work and entrepreneurship

To see how studying both extensive and intensive margin spillovers is informative about *what* is transmitted across coworkers, consider a version of the occupational choice model of Lucas (1978).[2] Suppose a positive mass of individuals maximize utility by choosing between wage work and entrepreneurship, given an equilibrium wage $w$. Let individuals be heterogeneous along two dimensions: how productive they would be as an entrepreneur (given by productivity $z$) and how costly entrepreneurship is to them (given by fixed cost $c$). (Note that productivity $z$ is a distinct concept from, and will not be mapped to, revenue productivity defined in Section 2.)

Formally, individuals choose between work and entrepreneurship by maximizing

$$V(z,c;w) = \max_{x\in\{0,1\}} \Big\{ \underbrace{(1-x)w}_{\text{worker}} + \underbrace{x \max_{N}(f(z,N) - wN - c)}_{\text{entrepreneur}} \Big\}. \tag{OA.1}$$

Each individual chooses between wage work ($x = 0$), in which case they earn the equilibrium wage, or entrepreneurship ($x = 1$), in which case they earn a profit after optimizing their labor demand (i.e., optimal $N$), producing (where $f(z,N)$ increases in both inputs), and paying wages

[2] This conceptual framework is similar to that in Guiso, Pistaferri, and Schivardi (2021), who in turn follow Guiso and Schivardi (2011) and Lucas (1978). Note that Guiso, Pistaferri, and Schivardi (2021) also include physical capital, but this does not affect the intuition.

and the fixed cost. In equilibrium, the wage clears the labor market: given the equilibrium wage, the number of workers (labor supply) equals the total labor demand from entrepreneurs, with all individuals optimally choosing between work and entrepreneurship.

Individuals will opt for entrepreneurship if their payoff as an entrepreneur exceeds their payoff as a worker. An entrepreneur's productivity $z$ increases their payoff as an entrepreneur, while their cost $c$ decreases it. Conceptually, $z$ captures an entrepreneur's ability to extract more profits from a given level of labor, which empirically might derive from a new entrepreneur's skills in conducting market research, producing initial products and services, and hiring and managing productive workers.[3] Meanwhile, $c$ captures the fixed costs to entrepreneurship, which for new entrepreneurs may include overhead costs as well as logistical necessities, such as choosing the optimal legal structure and banking relationships for a firm as well as correctly obtaining and maintaining tax IDs, licenses, and permits.[4]

The solution to this model has a simple cutoff property: for any given level of $c$, there is a threshold level of $z$ above which individuals choose to become entrepreneurs, given the wage. Conditional on the fixed cost, individuals with a "high enough" productivity opt into entrepreneurship. This threshold, $z^*(c)$, is defined as the productivity at which an individual is indifferent between wage work and entrepreneurship, given the wage and cost $c$. Denoting $\pi(\cdot)$ as profits, given optimal labor demand and the wage (excluding the fixed cost), this threshold satisfies[5]

$$w = \max_N (f(z^*(c), N) - wN - c) = \pi(z^*(c); w) - c. \tag{OA.2}$$

The threshold $z^*(c)$ increases in $c$: as entrepreneurship becomes more costly, only the relatively

[3] In Lucas (1978), this productivity is known as managerial technology and encompasses both managerial skill and span of control.

[4] The fixed cost $c$ may also capture the mental burden of entrepreneurial risk, etc. See examples of lists of all the decisions entrepreneurs must make from the U.S. Small Business Association (https://www.sba.gov/business-guide/10-steps-start-your-business) and *Forbes* (https://www.forbes.com/sites/allbusiness/2018/07/15/35-step-guide-entrepreneurs-starting-a-business/?sh=34ea1f54184b). Some of these decisions are highly logistical and build up institutional knowledge, while other decisions are more closely linked to the productivity, and thus profitability, of the business.

[5] Note that because $c$ only enters additively in the payoff, optimal $N$ does not depend on $c$.

more productive individuals will choose entrepreneurship.[6] This means that, all else equal, raising the fixed cost to entrepreneurship translates into a higher productivity of the marginal entrepreneur:

$$\frac{\partial z^*(c)}{\partial c} > 0. \tag{OA.3}$$

Additionally, this threshold means that, in equilibrium, individuals who choose entrepreneurship but are unproductive as entrepreneurs are likely to have low cost; otherwise, they would have chosen to work.

### OA.2.2 Comparative statics: Entrepreneurial spillovers to productivity and cost

Given this framework, consider how entrepreneurship decisions and individuals' $z$ and/or $c$ change because of entrepreneurial spillovers. The spillovers have implications for both the decision to become an entrepreneur (the extensive margin) and the productivity of the marginal entrepreneur (the intensive margin), which motivates my empirical analysis in the remainder of the paper. Here, I consider the partial equilibrium implications of entrepreneurial spillovers (i.e., ignoring any effects of the spillovers on wages), which matches the structure of my individual-level analyses in Sections 3 and 5, in which the economy is implicitly held fixed. I additionally briefly consider the general equilibrium, in which wages may change with spillovers.

Suppose there are spillovers that shift the distributions of $z$ and $c$, e.g., increasing the average $z$ and/or decreasing the average $c$ for individuals who work with entrepreneurial coworkers. How do these spillovers affect individuals' entrepreneurial decisions, as well as the characteristics of entrepreneurs in the economy? In partial equilibrium, the implications of spillovers are straightforward: increases in $z$ and decreases in $c$ both push individuals towards entrepreneurship, but only increases in $z$ increase the productivity of the marginal entrepreneur.

Formally, suppose that individuals learn from their entrepreneurial coworkers. First, if an individual works with more former entrepreneurs who have lower values of $c$, then they "learn" to lower their own $c$ (e.g., because they learn institutional knowledge from the low-$c$ entrepreneurs).

[6] This is because production (and thus profits, excluding the fixed cost) increases in $z$, while the total payoff to entrepreneurship decreases in $c$. Taking partial derivatives of equation (OA.2), we see that $\frac{\partial z^*(c)}{\partial c} = \left(\frac{\partial \pi(z^*(c);w)}{\partial z^*(c)}\right)^{-1} > 0$.

Second, if an individual works with more former entrepreneurs who have higher values of $z$, then they "learn" to increase their own $z$ (e.g., because they learn entrepreneurial skills that increase their productivity from the high-$z$ entrepreneurs).[7]

As discussed above, both increasing their $z$ and decreasing their $c$ will push individuals towards choosing entrepreneurship, since both increase their relative payoff from entrepreneurship, as seen in equation (OA.2).[8] Holding the wage fixed, an increase in $z$ or a decrease in $c$ yields a larger payoff from entrepreneurship, such that an individual is more likely to opt into entrepreneurship.[9]

Meanwhile, spillovers to $z$ and $c$ have different effects on the productivity of the marginal entrepreneur. If an individual's $c$ decreases, they are more likely to choose entrepreneurship regardless of whether they have a lower $z$, such that spillovers that decrease $c$ lead to marginally less-productive entrepreneurs; formally, because the threshold level of $z$ above which individuals choose entrepreneurship increases with $c$, as shown in equation (OA.3), reducing $c$ predicts that the marginal entrepreneur has a lower $z$ in partial equilibrium. Spillovers that increase $z$, however, will increase the entrepreneurial productivity of the marginal entrepreneur, as well as the average productivity (under frequently used distributional assumptions).[10] Taken together, this means that the ultimate partial equilibrium effect of spillovers on the entrepreneurial productivity will depend on which of the two spillovers — i.e., productivity and cost — dominate for the average individual, which is ultimately an empirical question.

Therefore, this conceptual framework demonstrates that I can measure the presence of spillovers by studying the *extensive margin* (i.e., the decision to become an entrepreneur), by leveraging vari-

[7]It is also possible that exposure to entrepreneurial coworkers may decrease an individual's $z$, e.g., if these coworkers give bad advice. Exposure may also increase an individual's $c$, e.g., if these entrepreneurial coworkers convey how difficult entrepreneurship can be, which could increase the cost of entrepreneurship. Below, I argue that the empirical evidence does not support these alternatives playing dominant roles.

[8]Formally, $\frac{\partial \Pr(x=1)}{\partial c} < 0$ and $\frac{\partial \Pr(x=1)}{\partial z} > 0$, where $\Pr(x=1)$ denotes the probability an individual chooses to be an entrepreneur, i.e., the probability that $w \leq \max_N(f(z,N) - wN - c)$.

[9]See Guiso, Pistaferri, and Schivardi (2021) and Guiso and Schivardi (2011) for a complete discussion of how entrepreneurial spillovers within locations push more individuals towards entrepreneurship.

[10]It is possible for spillovers that increase $z$ to decrease the average productivity of equilibrium entrepreneurs through a composition effect if some low productivity individuals have their productivity increased "just enough" to induce them to choose entrepreneurship without making them high productivity entrepreneurs. As Guiso, Pistaferri, and Schivardi (2021) argue, positive spillovers in productivity increase the average entrepreneurial productivity in general if entrepreneurial productivity is drawn from a log-concave distribution (Barlow and Proschan (1975)), e.g., is distributed as uniform, normal, or exponential; an example of a non-log-concave distribution is a bimodal one.

ation in exposure to any (i.e., low $c$ and/or high $z$) entrepreneurial coworkers; and then disentangle the spillovers in $z$ and $c$ by studying the *intensive margin* (i.e., the quality of entrepreneurs), by leveraging variation in exposure to more productive (i.e., high $z$) entrepreneurial coworkers. Namely, we want to determine in which box below each individual who works with entrepreneurial coworkers is located:

| | | Spillovers to $c$? (i.e., $c \downarrow$) | |
|---|---|---|---|
| | | Yes | No |
| Spillovers to $z$? (i.e., $z \uparrow$) | Yes | $+$ extensive margin, $+/-$ intensive margin | $+$ extensive margin, $+$ intensive margin |
| | No | $+$ extensive margin, $-$ intensive margin | no effects |

In Section 3, I demonstrate the presence of spillovers by studying the extensive margin. I show that individuals who work with more entrepreneurial coworkers are more likely to subsequently become entrepreneurs themselves. I interpret this positive extensive margin result as indicating the presence of spillovers, i.e., ruling out the southeast box in the table above. Namely, individuals who work with entrepreneurial coworkers learn *something*, although this exercise cannot distinguish between whether they learn to lower their $c$'s or increase their $z$'s.

In Section 5, I disentangle the spillovers to $z$ and $c$ by studying the intensive margin, in order to determine in which of the other boxes exposed individuals are located. I show that individuals who work with more entrepreneurial coworkers (who are high-$z$ and/or low-$c$) tend to become less productive entrepreneurs, starting smaller firms that are less likely to survive than other new firms; this suggests spillovers to $c$. However, *if* the entrepreneurial coworkers themselves started relatively productive firms, and thus were likely high-$z$ entrepreneurs, the individuals start relatively productive firms too, suggesting spillovers to $z$.[11] Through these analyses, I conclude that

[11] The positive intensive margin results for individuals exposed to more productive entrepreneurial coworkers could also arise if these successful coworkers discourage entrepreneurial ventures that are likely to fail, i.e., generating positive selection into entrepreneurship. I provide evidence against this option in Section 3, where I show that, in general, exposure to more productive entrepreneurial coworkers also predicts entrepreneurship. That is, productive

spillovers to both $c$ and $z$ exist, such that exposed individuals are located in the northwest box. These individuals are more likely to become entrepreneurs, but their predicted success depends on their relative exposure to high-$z$ versus low-$c$ entrepreneurial coworkers.

### OA.3 Additional robustness checks

This section provides additional identification tests for the extensive margin spillovers, expanding upon the analyses covered in Section 3.3, which already presents panel regression evidence with establishment fixed effects; the analyses here are intended to be additional checks. I provide additional support that the results are not driven by entrepreneurial individuals simply selecting into particular peer groups.

**Reminder of estimated models** For ease of reading, here I replicate the estimated models in the paper, which are referred to below.

$$\begin{aligned}\text{Future entrepreneurship}_{i,n,s} = \alpha + \beta\,&\text{Share of coworkers with entrepreneurship}_i \\ &+\mathbf{X}_{i,n,s}\delta + \xi_{i,n,s},\end{aligned} \tag{1}$$

$$\begin{aligned}\text{Future entrepreneurial outcome}_{i,n,s} = \alpha + \beta_1&\text{Share of coworkers with entr.}_i \\ +\beta_2&\text{Share of coworkers with entr. \& firm outcome}_i \\ &+\mathbf{X}_{i,n,s}\delta + \xi_{i,n,s},\end{aligned} \tag{2}$$

**Selection into workplaces** If entrepreneurship-prone individuals cluster at certain firms, regardless of reason, then there should be nothing inherently "special" about an individual's establishment coworkers within their firm. That is, the relationship from model (1) should be similar if instead of considering establishment coworkers, I estimate the relationship between an individual's future entrepreneurship and the entrepreneurial experience of employees at their firm, particularly employees at other establishments within the same firm with whom they may never interact (and thus from whom they should not learn). I estimate versions of model (1) where in addition to

entrepreneurial coworkers do not appear to discourage entrepreneurship, on average. Additionally, as noted in footnote 10, it is possible for spillovers that increase $z$ to lead to lower average productivity through a composition effect. The fact that I measure the positive intensive margin results for individuals exposed to more successful entrepreneurs suggests that the marginal impact of spillovers that increase $z$ is positive.

considering exposure to entrepreneurial coworkers at an individual's establishment, I also consider "exposure" to coworkers at the firm at large or at *other* establishments belonging to the same firm.

Table OA.3 shows that spillovers are concentrated within-establishment: regardless of which set of other establishments at the firm I consider, an individual's future entrepreneurship is disproportionately related to their establishment coworkers' past entrepreneurship, rather than to the entrepreneurial experience of other employees at the firm. I find that all evidence of spillovers load onto establishment coworkers, rather than firm workers in general. Furthermore, I find substantially larger coefficients on exposure to entrepreneurial establishment coworkers compared to entrepreneurial other-establishment workers. For example, when I horse-race the entrepreneurial share of an individual's establishment coworkers with that of workers at all other establishments in the firm (column 5), the coefficient on the establishment coworkers is more than 9 times larger than the coefficient on the other-establishment workers. Similar gaps appear if I only consider particular sets of other establishments, including those in the same state or industry. While there is some scope for general firm patterns (i.e., the coefficients on the share of other-establishment coworkers who were entrepreneurs are nonzero), the spillover pattern is dominated by establishment patterns.

**Selection into coworker groups** Beyond selection into particular firms or establishments, nascent entrepreneurs could also select based on the coworkers themselves. To address this concern, I consider two analyses.

First, I consider spillovers from coworkers who join the firm before and after an individual joins (but who are still employed at the establishment in 2004); if an individual joins an establishment to work with particular coworkers, then they may only appear to learn from the coworkers who were already employed at the firm before they joined, on whom they could select when joining. Instead, in Table OA.16, when I estimate model (1), splitting the coworkers into bins of when they join the firm, I find that individuals also learn from coworkers who join after them: I estimate positive coefficients on exposure to entrepreneurial coworkers who joined an establishment both before and after (and in the same year as) the individuals. I take this as evidence that the extensive margin spillovers are not wholly driven by coworkers who joined the firm after the individual, i.e., who

the individual may have known would be their coworker when they joined the firm.

Second, as Jarosch, Oberfield, and Rossi-Hansberg (2021) argue for the case of human capital spillovers, if individuals truly seek out entrepreneurial coworkers, then this may be reflected in their wages — these individuals may accept lower wages in exchange for working with these coworkers. Empirically, this is not the case on average. In Table OA.17, when I estimate model (1) and replace future entrepreneurship with current earnings as the outcome (and control for past earnings instead of current earnings) for new hires, I see that individuals who join establishments with more entrepreneurial coworkers earn, if anything, higher earnings. Conditional on past earnings, a new hire with a one standard deviation (8.9 percentage point) higher share of coworkers with recent entrepreneurship is predicted to have 1.4% higher earnings.

**Selection at the individual level** Suppose selection is inherently fixed within an individual — some people are just more likely to become entrepreneurs than others. If this is true, and these individuals appear at workplaces with more entrepreneurial coworkers before they become entrepreneurs themselves for some reason, then the patterns I find may still reflect simple selection. I test this in Table OA.18, where I leverage variation in exposure to entrepreneurial coworkers *within* an individual's work history in order to study the timing of the individual's entrepreneurship.[12]

I take a sample of individuals who work between 1999 and 2008 and become entrepreneurs at least once between 2000 and 2009. For this sample, I predict how future entrepreneurship varies with variation in exposure to entrepreneurial coworkers *within*-individual, via the inclusion of person fixed effects. These estimates capture how entrepreneurial coworkers predict the *timing* of entrepreneurship, amongst the group of ever-entrepreneurs. As Table OA.18 shows, even within-individual, exposure to entrepreneurial coworkers predicts future entrepreneurship: within-individual, a one standard deviation increase in the share of entrepreneurial coworkers predicts a 1.8% higher likelihood of subsequent entrepreneurship relative to the mean.[13] Thus, we see

[12]This person panel analysis is inspired by Table 4 of Nanda and Sørensen (2010).

[13]The 1.8% effect is smaller than the effects measured in previous analyses for two (or potentially more) reasons. First, this analysis takes into account important selection (fixed at the individual level) that is not removed in previous analyses. Second, in this analysis I focus on entrepreneurship within the next year as the outcome in order to remove mechanical dependence in outcomes within an individual. This timing may curtail the role of spillovers if some spillovers take time to be observable (e.g., if individuals learn entrepreneurship today but only formalize their business

patterns of spillovers even within-individual, accounting for fixed components of selection at the individual level.

**Common shocks** Common shocks outside of the firm could drive both an individual's future entrepreneurship and their coworkers' past entrepreneurship. However, there is little space nor evidence for these common shocks, conditional on the rich set of controls in model (1). Model (1) includes detailed 6-digit industry and state fixed effects, such that any common shocks would have to operate within these categories. In untabulated results, I additionally estimate model (1) including state-by-6 digit industry fixed effects and find consistent results. For single-location establishments, I can also identify the establishments' ZIP codes from the LBD; in Table OA.19, for the sample of individuals at these establishments, I find the estimated spillovers are actually larger when I include ZIP code and ZIP code-by-6-digit industry fixed effects. Common shocks would have to operate within these ZIP code-industry pairs in order to drive the estimated spillovers.[14]

Further, it is not the case that the results are driven by the five-year time windows, which could map to business cycles. Instead, in Figure OA.2 I estimate model (1) for exposure to coworkers who were entrepreneurs in each of the past 10 years, and the results are similar regardless of when the coworkers were entrepreneurs. Similarly, if I estimate separate versions of model (1), considering exposure to entrepreneurial coworkers whose entrepreneurship happened more or less recently; in Table OA.20, the positive spillovers already exist when I only consider exposure to coworkers who were entrepreneurs in the past year (i.e., in 2003) and persist if I consider exposure to coworkers who were entrepreneurs in the past years, up to 10 years (i.e., between 1994 and 2003).

Entrepreneurship could also depend on time-varying local factors, such as a changing entrepreneurial environment, that would not be accounted for by the inclusion of location fixed effects. I study this potentially confounding factor by horse-racing spillovers across coworkers

more than one year in the future).

[14]For individuals at single-location establishments, in the baseline specification (with state and industry fixed effects), a one standard deviation (13.2 percentage point) increase in the share of coworkers with recent entrepreneurship experience predicts a 0.17 percentage point increase in the likelihood of future entrepreneurship, 3.9% of the mean outcome. When I include ZIP code-by-industry fixed effects, a one standard deviation increase predicts a 0.26 percentage point increase, 5.8% of the outcome.

with potential location-based spillovers, as measured by the inclusion of the local entrepreneurship rate as a control. Table OA.6 demonstrates that the spillovers across coworkers are distinct from spillovers at the local level — while working in a more entrepreneurial location and sector predicts entrepreneurship, consistent with findings such as in Guiso, Pistaferri, and Schivardi (2021), spillovers across coworkers still have an effectively unchanged measured effect.

### OA.4 Survey evidence of spillovers

In this section, I provide survey evidence of entrepreneurial spillovers in support of that story: entrepreneurs who previously worked with more entrepreneurial coworkers are more likely to report that entrepreneurial role models led them to start firms. After matching entrepreneurs in the LEHD to owners in the ASE survey data, I find that ASE entrepreneurs who previously worked with more entrepreneurial coworkers are more likely to say that exposure to entrepreneurs influenced their decisions to start firms.

For the top four owners of each firm in the 2014-2016 surveys, the ASE asks "How important to Owner [n] are each of the following reasons for owning this business?" Respondents are faced with a list of options,[15] each of which they can label "Not Important," "Somewhat Important," or "Very Important." While there is no direct question about previous coworkers, the option "an entrepreneurial friend or family member was a role model" may refer to coworkers who are also friends.[16]

Given this survey question, I estimate whether individuals with higher shares of coworkers with previous entrepreneurship are more likely to cite this "role model" reason for their entry to entrepreneurship, conditional on appearing in the ASE after working with those coworkers. I

[15]These include: "wanted to be my own boss," "flexible hours," "balance work and family," "opportunity for greater income/wanted to build wealth," "best avenue for my ideas/goods/services," "couldn't find a job/unable to find employment," "working for someone else didn't appeal to me," "always wanted to start my own business," "an entrepreneurial friend or family member was a role model," and "other."

[16]According to the May 2021 American Perspectives Survey, 54% of Americans with close friends report making those friends at their (or their spouse's) workplace (Cox (2021)), and Chetty et al. (2022) identify the workplace as a common place friendships are born. To the degree that this question reflects non-coworker friends and family members, I expect measurement error to reduce precision in my results. In a survey of Dutch entrepreneurs, Bosma et al. (2012) find that entrepreneurs' self-reported role models tend to be their family members, friends, former colleagues, or former employers and are very rarely business icons.

estimate model (1) but replace future entrepreneurship as the outcome with stating that role models were at least somewhat important.

There are two challenges to running this analysis. First, the ASE begins in 2014; since exposure to entrepreneurship may affect the quality of a future entrepreneur's firm (see Section 5), matching individuals in 2004 to firms in the ASE may produce a very selected group of individuals whose entrepreneurial firms were successful enough to survive to 2014. Furthermore, entrepreneurs in 2014 may have imperfect recall of their motivations and experiences a decade earlier. For these reasons, I estimate this model on a new sample: individuals in 2009-2012 who become an entrepreneur in 2013[17] and whose entrepreneurial firm is surveyed in at least one of the three ASE rounds; I restrict to the last year I see each individual within the 2009-2012 and measure coworkers in that year.

The second challenge lies in that the ASE does not contain identification numbers for the owners, so I cannot directly match the individuals I identify as entrepreneurs in the LEHD to the ASE owners. Instead, for individuals in the LEHD who become entrepreneurs and whose entrepreneurial firm is surveyed in the ASE, I check whether their demographics align with those of any of the owners described in the ASE. Specifically, I match the entrepreneurs in the LEHD to ASE owners of their entrepreneurial firm on the basis of sex, education, race, age, and birth country and keep the sample of entrepreneurs who match to at least one owner; for individuals who match to more than one owner along these demographics, I average across the owners' responses.[18] In the resulting sample of 7,000 entrepreneurs, 55% of individuals say that entrepreneurial role models were at least somewhat important to their decision to become an entrepreneur.

Consistent with the presence of spillovers, estimates of model (1) show that entrepreneurs who previously worked with more entrepreneurial coworkers are more likely to report that en-

[17] Ideally, I would study firms in the ASE that start in 2014, 2015, or 2016; unfortunately, the currently available LEHD ends (with amply available SEIN to FIRMID matching) in 2013.

[18] In each year of the ASE, information is reported for up to 4 owners; some firms are re-sampled across the survey waves, such that each firm will have at least 1 owner and at most 12. I restrict to owners who self-identify as founders of the firm. I match individuals on non-imputed sex, education, race, age bin, and birth in the U.S.; for each individual, I allow for up to 1 of these categories to not match in order to call the match a success. I restrict to individuals who match to at least one owner; 80.4% of individuals who are matched are uniquely matched to only one owner in at least one year.

trepreneurial role models were important to their decision to start a firm. Specifically, entrepreneurs who worked with a one standard deviation (15.5 percentage point) higher share of coworkers with entrepreneurial experience are 2.4% more likely to report that entrepreneurial role models were at least somewhat important for their entrepreneurship, relative to the mean.[19] In other words, the individuals whom I predict to have been influenced by entrepreneurial models, via their exposure to entrepreneurial coworkers, are indeed more likely to report this influence, consistent with these spillovers actually taking place.

### OA.5 Alternative hypotheses: Spawning, exposure to leaders, and workplace culture

While I argue that the positive extensive margin results are consistent with a story of entrepreneurial coworkers passing on entrepreneurial knowledge or skills (or generally inspiring) potential entrepreneurs, it is worth considering alternative hypotheses.

**Spawning** Entrepreneurial spillovers do not appear to be driven by firm behavior promoting entrepreneurship nor by entrepreneurial coworkers bringing individuals along for their next venture, collectively known as entrepreneurial spawning (also known as spin-outs or spin-offs) (Klepper and Sleeper (2005), Gompers, Lerner, and Scharfstein (2005), Babina, Ouimet, and Zarutskie (2018)). I find that my spillover results are not driven by firm lifecycle patterns or success (Table OA.22), and the spillovers are not characterized by individuals starting firms *with* their entrepreneurial coworkers (Table OA.23).[20]

**Exposure to leaders** Entrepreneurial spillovers are also not driven by exposure to firm leaders in general, who may teach individuals leadership skills or human capital. Exposure to coworkers who were recently leaders of new firms, rather than firms of any age, disproportionately predicts entrepreneurship. In Table OA.23, I horse-race spillovers from entrepreneurial coworkers against coworkers who were recently top earners at any firm, not just new ones. While exposure to top earners in general also predicts entrepreneurship, there is a distinct role for entrepreneurial cowork-

[19] See Table OA.21 for estimates. This calculation is as follows: one standard deviation in the share of coworkers with entrepreneurship (0.155) times the coefficient on the share of coworkers with entrepreneurship (0.084) divided by the share of entrepreneurs who report that entrepreneurial role models were at least somewhat important (0.5507).

[20] Future entrepreneurs do often start firms with their coworkers, but not disproportionately their *entrepreneurial* coworkers.

ers: the coefficient on the share of coworkers who were recently entrepreneurs is nearly three times larger than the coefficient on the share of coworkers who were recently a top earner at any firm. I interpret these results as evidence that the process of entrepreneurship — i.e., of being a top earner at a new firm — is a meaningful experience, above and beyond that of being a leader at a firm in general, from which others can learn.

**Workplace culture** Entrepreneurial spillovers are not driven simply by exposed individuals being more likely to leave their firm, for instance because their entrepreneurial coworkers create unpleasant workplace cultures or generically encourage trying new careers. In Table OA.23, I restrict to individuals leaving their firm in 2004; I still find evidence of positive spillovers, with a one standard deviation (9.4 percentage point) increase in the share of coworkers who were recently entrepreneurs predicts a 0.37 percentage point increase in the likelihood of entrepreneurship, 9.1% of the mean outcome.

## OA.6 Additional extensive margin heterogeneity and intensive margin outcomes

Here I present additional heterogeneity and outcome analyses.

### OA.6.1 Extensive margin heterogeneity

**Heterogeneity by characteristics of coworkers' past entrepreneurial firms** Because entrepreneurial experience can vary vastly in success, and thus likely enjoyability, it is possible that these extensive margin spillovers may vary by the characteristics of the coworkers' past entrepreneurial firms. Indeed, I find that the positive spillovers are generally amplified when the entrepreneurial coworkers ran relatively successful firms.

Why might the spillovers vary by the quality of the entrepreneurial coworkers' firms? Entrepreneurial experience can vary significantly, leading to coworkers potentially having different skills and evaluations of entrepreneurship. For instance, coworkers whose entrepreneurial firms failed may express the woes and stresses of entrepreneurship, discouraging other individuals from becoming entrepreneurs. Meanwhile, coworkers whose entrepreneurial firms were relatively successful may present more optimistic views of entrepreneurship or may be able to pass on knowl-

edge and skills that make prospective entrepreneurs expect success for themselves. Or, these relatively successful entrepreneurs may too discourage entrepreneurship, if they are able to provide criticism against poorly formed business ideas, as in Lerner and Malmendier (2013).

I explore this heterogeneity by estimating whether the extensive margin spillovers are increased or decreased if an individual's entrepreneurial coworkers ran more successful firms. I estimate an extended version of model (1) in which I add as an explanatory variable the share of an individual's coworkers who were both entrepreneurs in the past 5 years and whose firms were successful. I employ several measures of success here, namely whether the firm was among the top 10% of firms that entered in the same year and industry (6-digit NAICS) in terms of employment, payroll, revenue, and productivity.[21]

Table OA.10 presents the findings: conditional on general exposure to entrepreneurial coworkers, individuals who work with more *successful* entrepreneurs are even more likely to become entrepreneurs themselves. For example, conditional on general exposure to entrepreneurs, an individual with a one standard deviation (2.5 percentage points) higher share of coworkers who were entrepreneurs at firms in the top 10% of entry year employment is 0.05 percentage points more likely to become an entrepreneur, a 1.7% increase relative to the mean. That is, on net, neither unsuccessful nor successful (by these metrics) entrepreneurial coworkers discourage entrepreneurship in general.

In Section OA.7, I provide evidence to reconcile the lack of discouragement in general with the findings of Lerner and Malmendier (2013). I identify entrepreneurial coworkers similar to the MBAs in Lerner and Malmendier (2013) and show that these particular entrepreneurial coworkers appear to discourage unsuccessful entrepreneurship, consistent with the findings in Lerner and Malmendier (2013). This comparison both supports the causal interpretation of my paper's spillovers, since my findings for this particular group are consistent with those from a setting with exogenous variation, and suggests that my estimates may better capture the experience of the av-

[21]The LBD provides information on national firm-level revenue and employment for larger employers in the U.S. beginning in 1997, allowing me to study firm revenue productivity (Haltiwanger et al. (2017)).[22] Note that this data is available to researchers on approved projects through the Federal Statistical Research Data Center (FSRDC) network, where additional documentation is available (Haltiwanger et al. (2019)).

erage American worker. I further explore what the characteristics of coworkers' entrepreneurial firms predict for future entrepreneurs' firms in Section 5.

**Ages of individuals and their coworkers** I investigate heterogeneity in spillovers by age, both in terms of the age of the individuals and the ages of their entrepreneurial coworkers.[23] Both of these dimensions are important since they are informative about who is affected by spillovers and yield some predictions on the future relevance of spillovers as the population ages.

First, I estimate model (1) but interact the exposure variable with dummies capturing the age of the individuals, continuing to include age fixed effects that account for baseline differences in future entrepreneurship rates. The estimates from this model, as shown in Panel A of Figure OA.1, show an inverse-U relationship between individual age and spillovers: younger individuals are the most likely to become entrepreneurs after working with more entrepreneurial coworkers, with the largest spillovers experienced by individuals around the age of 30.

The pattern of younger individuals experiencing stronger spillovers is consistent with the notion that younger individuals tend to be the most entrepreneurially opportunistic: Bernstein et al. (2018) argue that young and skilled individuals drive new firm creation in response to local demand shocks. Younger individuals "learning" more in terms of entrepreneurship is also consistent with general learning patterns in the workforce, as Jarosch, Oberfield, and Rossi-Hansberg (2021) argue that individuals below the age of 40 learn human capital from their coworkers more quickly than older individuals. Part of this pattern might also be driven by younger individuals having the most to learn about entrepreneurship; older individuals likely have already been exposed to entrepreneurs during their time in the labor market, and so might have less to learn from current coworkers.

Second, I investigate how spillovers vary with the ages of the entrepreneurial coworkers. I estimate model (1) but consider exposure to entrepreneurial coworkers of specific ages (controlling

[23]The recent literature has highlighted that entrepreneurship patterns vary dramatically by age: older individuals are disproportionately less likely to become entrepreneurs than younger ones, but tend to start more successful firms (Azoulay et al. (2018)). These patterns have led to arguments that population aging has driven declines in firm entry and business dynamism (Engbom (2019); Hopenhayn, Neira, and Singhania (2020); Karahan, Pugsley, and Şahin (2019)).

for the share of all coworkers who are each age). Panel B of Figure OA.1 shows the estimates of this model, demonstrating that spillovers tend to decrease with the age of the entrepreneurial coworkers: individuals are less likely to become entrepreneurs if their entrepreneurial coworkers are older.

While the above two analyses suggest that spillovers are largest when individuals are younger and entrepreneurial coworkers are younger, it is not the case that the spillovers are restricted to individuals of similar ages. Instead, when I interact the age of the individual with the ages of their entrepreneurial coworkers, as shown in Table OA.11, I find that individuals tend to learn from coworkers who are older than them.[24] This may be because older coworkers are more likely to serve as role models or mentors.

**Relative earnings** As Table 1 shows, individuals who become entrepreneurs tend to earn more than and are more likely to have graduated from college than individuals who do not become entrepreneurs, and so it is possible that higher earning and skilled individuals drive the estimated spillovers.[25] In fact, in my context there is no substantial heterogeneity by earnings. I estimate model (1) but interact the exposure variable with dummies capturing in which quartile of the aggregate earnings distribution individuals' 2004 earnings fall. In Table OA.7, I find similar coefficients for all quartiles except for the lowest.[26] That is, individuals earning in the top 75 percent of the aggregate earnings distribution are similarly affected by spillovers, at least when compared coarsely in terms of earnings quartiles.[27]

[24] In the context of human capital learning, Jarosch, Oberfield, and Rossi-Hansberg (2021) find that individuals who are younger than 40 are the most likely to learn, particularly from other young workers.

[25] Bernstein et al. (2018) argue that higher-skilled individuals are more responsive to entrepreneurial opportunities in the case of demand shocks.

[26] If instead I consider in which earnings quartile an individual's earnings falls *within their establishment*, I find the largest coefficient on the share of coworkers who were recently entrepreneurs for individuals the second highest quartile, although the pattern remains that all but the bottom quartile experiences relatively similar (and positive) spillovers.

[27] The fact that the bottom quartile experiences fewer spillovers is unsurprising for several reasons. First, these individuals may not have the capital needed to start firms and consequently cannot respond to entrepreneurial coworkers. Second, some of these workers may have low earnings because they are starting and/or leaving jobs in 2004; in this case, they may have less exposure to entrepreneurial coworkers. Third, some of these workers may be part-time workers who are uninterested in full-time entrepreneurship. Note that for individuals switching jobs, I keep their highest-paying firm (such that the data is at the individual level) and only count their earnings at that firm. In an unreported analysis, I confirm that my main extensive margin estimates are robust to excluding the probable part-time workers, i.e., individuals earning below one quarter's worth of full-time minimum wage.

**Previous entrepreneurship experience** Lastly, I investigate whether individuals with previous entrepreneurial experience themselves experience spillovers. On the one hand, previous entrepreneurs have already demonstrated a desire or willingness to be entrepreneurs and so might be particularly receptive to any lessons that entrepreneurial coworkers teach. On the other hand, previous entrepreneurs already have entrepreneurial experience and so may already know these lessons; they may also already know that they do not enjoy entrepreneurship, and so will not be pushed to entrepreneurship by their coworkers.

I explore spillovers for previous entrepreneurs by estimating a version of model (1) in which I add the interaction between an individual's previous (1999-2003) entrepreneurship with the share of their coworkers who were previously entrepreneurs. As Table OA.11 shows, individuals with recent entrepreneurial experience themselves have, if anything, negative extensive margin spillovers: the coefficient on the interaction is negative and larger in magnitude than the coefficient on the share by itself.

I interpret this as evidence that previous entrepreneurs have little to learn from the average entrepreneurial coworkers.[28] I view this evidence also as a robustness check: if it were the case that entrepreneurial individuals, including those who were recently entrepreneurs, clustered at firms that promoted future entrepreneurship, such that spillovers are unrelated to coworkers directly, we might see spillover patterns for these previous entrepreneurs too. Previous entrepreneurs being unaffected by spillovers reduces this identification concern.

### OA.6.2 Intensive margin outcomes

Beyond the traditional measures of firm characteristics studied in Section 5, I explore other ways in which more exposed individuals' entrepreneurial firms differ, which provides some intuition for mechanisms. I find that exposure to entrepreneurial coworkers does not predict a higher likelihood of becoming publicly traded by making an initial public offering (IPO). Furthermore, exposed individuals tend to start firms that are less innovative, generating fewer patents, copy-

[28] This evidence is consistent with survey evidence by Bosma et al. (2012), who find that experienced entrepreneurs are less likely to report using role models than new entrepreneurs.

rights, and trademarks. I find that, in some cases, entrepreneurs are more likely to start firms in the sectors in which their entrepreneurial coworkers ran firms. Finally, I find that these firms of more exposed individuals tend to have less within-firm earnings inequality, operate with less structured management practices, are more often financed by the owners, and are less likely to be family-owned (e.g., not having financing from family members).

**Initial public offerings** A standard measure of extreme success and desire to grow is whether a firm makes the transition to being publicly traded by making an initial public offering (IPO) (Brau and Fawcett (2006)). I investigate whether exposure to more entrepreneurial coworkers predicts whether an entrepreneur starts a firm that becomes publicly-traded (i.e., appears in the CSB). I estimate model (2) for outcomes of whether an entrepreneur's firm becomes publicly-traded within its first five years or ever between 2005 and 2016, the last year covered in the CSB data. In Table OA.24, I find imprecise zeros for the coefficients on the share of coworkers who were recently entrepreneurs. Because becoming publicly-traded is a very rare event — only 0.1% of entrepreneurs start firms that ever become publicly-traded by 2016 — the estimates lack precision. However, the confidence intervals implied by the standard errors are still small and close to zero.[29] I conclude that entrepreneurs who are generally exposed to more entrepreneurial coworkers are not dramatically more or less likely to start firms that become publicly-traded.

**Innovation** Another measure of firm performance is innovation. I investigate the connection between exposure to entrepreneurial coworkers and innovation by using a broad sample of individuals in 1999-2012 who become entrepreneurs within five years and whose firms are covered by the 2014-2016 ASE; I restrict to the most recent (prior to the entrepreneurship) appearance in the LEHD in order to avoid double counting individuals. I estimate a version of model (2) for the outcome of whether an entrepreneur's firm reports that it owns any patents (pending or granted), copyrights, or trademarks. In Table OA.25, I find that entrepreneurs who worked with more en-

[29] For example, the standard error for the estimated coefficient on the share when studying becoming publicly traded within 5 years, 0.00023, indicates that I can reject the null hypotheses that a one standard deviation increase in the share of entrepreneurial coworkers predicts a greater (in magnitude) than 0.011 percentage point (10.5% of the mean outcome) lower or greater than 0.003 percentage point (2.6% of the mean outcome) higher likelihood of becoming publicly traded within 5 years.

trepreneurial coworkers are less likely to start firms that report owning patents, copyrights, or trademarks. A one standard deviation (15.9 percentage point) increase in the share of entrepreneurial coworkers predicts a 0.4 percentage point lower likelihood, a 2% decrease relative to the mean.

**Sector choice** Beyond impacting an individual's likelihood of becoming an entrepreneur and their ultimate success, entrepreneurial coworkers may also affect the type of firm they start. In particular, entrepreneurial coworkers may push individuals towards (or away from) the sectors in which they were entrepreneurs, since the coworkers may have particular industry knowledge or networks that they can transmit to an individual. Because past industry experience is a strong predictor of entrepreneurial success (Azoulay et al. (2020)), it is plausible that exposure to entrepreneurs from a particular industry may serve as a substitute for personal experience in that sector. In Table OA.8, I estimate versions of model (2) where I study outcomes of whether an entrepreneur starts a firm in different sectors, both depending on their general exposure to entrepreneurial coworkers and exposure to entrepreneurial coworkers who ran firms in the given sector.[30] I find substantial variation in patterns across sectors. I find that general exposure to entrepreneurial coworkers predicts that entrepreneurs start firms in agriculture, wholesale trade, finance and insurance, management, and arts and entertainment and not in manufacturing, administrative services, health, and accommodation and food services.[31] Furthermore, entrepreneurs are more likely to start firms in construction, professional, scientific and technical services, and accommodation and food services if they worked in another sector in 2004 with coworkers who had entrepreneurial experience in those sectors. These findings suggest that these entrepreneurial coworkers may be providing sector-specific knowledge or help to individuals and are consistent with survey evidence by Bosma et al. (2012), who find that entrepreneurs' role models tend to operate in the same sector as them.

[30] When studying coworkers with experience in a given sector, I focus on cases in which that sector is *not* the sector in which the individual and their coworkers work in 2004.

[31] For example, a one standard deviation (14.7 percentage point) increase in the share of coworkers who were recently entrepreneurs predicts that an entrepreneur is 0.09 percentage points more likely to start a firm in wholesale trade, a 1.7% increase relative to the mean. It is also worth noting that these estimates account for individuals' 2004 establishments' industry (through the inclusion of 6-digit industry fixed effects); 45.3% of these entrepreneurs start firms in the same sector as their 2004 establishment, so relatively small shifts in entrepreneurial sector choice are still meaningful.

**Average pay and inequality** In Table OA.26, I explore spillovers to pay and inequality. I find that future entrepreneurs who worked with more entrepreneurial coworkers tend to start firms with higher mean log earnings and lower pay inequality (measured both as the variance of log earnings and the 90-10 gap of log earnings).

**Management structure** In analyses available upon request, I consider whether entrepreneurial coworkers convey managerial skills, inspired by Guiso, Pistaferri, and Schivardi (2021), who argue that learning management skills may be one important way in which entrepreneurship leads to more entrepreneurship. The 2015 ASE and 2010 Management and Organizational Practices Survey (MOPS) both collect information on how structured firms' management protocols are, and I can use these surveys to analyze this question. I find limited evidence for managerial skill transmission: entrepreneurs who previously worked with more entrepreneurial coworkers tend to run firms with less structured or sophisticated management practices.

**Financing** For individuals considering entrepreneurship, one potential stumbling block is financing.[32] Entrepreneurial coworkers may also help prospective entrepreneurs with financing, either directly investing in their firms or connecting them with outside investors or banks. I investigate this possibility by studying reported sources of start-up and general financing for firms in the ASE.

For the broad sample of individuals in 1999-2012 who become entrepreneurs within five years and whose firms are covered by the ASE used to study management above, I estimate versions of model (2) with outcomes on whether the entrepreneurial firms had start-up funding from venture capitalists (VC), banks, and/or family or friends as well as current funding from outside investors (including VC), banks, government grants, family or friends, and the owner themself. In Table OA.25, I find that entrepreneurs who worked with more entrepreneurial coworkers do not appear to be more likely to have start-up or current funding from outside investors, banks, and family or friends. If anything, these more exposed entrepreneurs are more likely to fund their firms themselves — a one standard deviation (15.1 percentage point) increase in the share of coworkers who were entrepreneurs predicts that an entrepreneur's firm is 0.5 percentage points more likely to

[32] Liquidity constraints have been found to have effects on levels of entrepreneurship, such that cash windfalls can significantly increase business formation, as shown recently by Bellon et al. (2021), e.g.

report that the owner currently personally puts money into the business, a 0.7% increase relative to the mean. This increase is modest, but alongside the other financing results is consistent with a story of entrepreneurial coworkers encouraging entrepreneurship without providing direct help, either through their own investment or through their finance networks.

**Hereditary entrepreneurship and family ownership** While I argue that entrepreneurial spillovers from coworkers can be important forces behind an individual's decision to become an entrepreneur, there are many other reasons individuals may pursue entrepreneurship. One widely cited reason is parental entrepreneurship: individuals whose parents have entrepreneurial experience are disproportionately likely to become entrepreneurs (Hvide and Oyer (2018), Akcigit et al. (2021)). For individuals with entrepreneurial parents, the impact of transitory coworkers likely pales in comparison to the lessons and capital input from their parents. Indeed, Nanda and Sørensen (2010) argue that entrepreneurial coworkers do not push individuals who have entrepreneurial parents towards entrepreneurship.

While I do not have access to parental entrepreneurship information,[33] I investigate whether individuals who work with more entrepreneurial coworkers are more or less likely to start family-owned firms (in which two or more members of the same family own the majority of the firm). If having entrepreneurial coworkers is a substitute for having entrepreneurial parents, and entrepreneurial parents contribute capital to their children's firms, I expect entrepreneurs who worked with more entrepreneurial coworkers to start firms that are not family-owned.

I investigate this using the broad sample of individuals in 1999-2012 who become entrepreneurs within five years and whose firms are covered by the ASE used above. I estimate a version model (2) for the outcome of whether an entrepreneur's firm reports that it is family-owned in the ASE (i.e., whether two or more members of one family own the majority of the firm). In Table OA.25, I find that more exposed entrepreneurs indeed are less likely to start family-owned firms, although the relationship is relatively small: a one standard deviation (15.1 percentage point) increase in

[33] It is, in theory, possible to link children to parents and analyze hereditary entrepreneurship using the LEHD. (Staiger (2020) links parents to children in the LEHD to study intergenerational employment patterns.) However, because of the short window in which I measure entrepreneurship, it would be difficult to measure the entrepreneurship of both parents and children. I leave this avenue for future research

the share of coworkers with entrepreneurial coworkers predicts that an entrepreneur's firm is 0.8 percentage points less likely to be family-owned, a 2.1% decrease relative to the mean. This result is consistent with the idea that having entrepreneurial coworkers provides a different pathway to entrepreneurship than having entrepreneurial parents.

### OA.7 Reconciling with Lerner and Malmendier (2013)

In the literature on entrepreneurial spillovers across individuals, Lerner and Malmendier (2013) leverage random assignment of Harvard MBAs students to class sections (and thus peers). Yet, their findings are strikingly different from my main results: Lerner and Malmendier (2013) find that class sections with more students with entrepreneurial experience actually generate fewer subsequent entrepreneurs, which they argue is driven by a decline in unsuccessful entrepreneurship. The authors interpret these patterns as evidence of former entrepreneurs dissuading ventures that are unlikely to succeed. Meanwhile, I find positive extensive margin spillovers, suggesting, at least on net, no evidence of dissuasion. How can we reconcile these findings?

I argue that context matters. While the random assignment of Harvard MBA students to class sections makes the findings of Lerner and Malmendier (2013) internally valid, the former and potential entrepreneurs among these classes are unlikely to represent the general population of entrepreneurs.[34] Harvard MBA students are likely wealthier, more educated, and younger than the average entrepreneur in the U.S., and likely start firms in different sectors.[35] Further, Harvard MBA students with past entrepreneurship experience may have negative views on entrepreneurship, having possibly chosen to pivot their careers through an MBA instead of continuing to be entrepreneurs.

In an attempt to reconcile my findings with Lerner and Malmendier (2013), I seek a group of entrepreneurial coworkers who are comparable to Harvard MBA students. I do this in two ways. First, I simply use one of my measures that identifies particularly successful entrepreneurs, i.e.,

[34] Furthermore, MBA programs typically involve extensive networking, such that the types of interactions within MBA programs might be quite different from the interactions of coworkers at firms.

[35] Lerner and Malmendier (2013) do not provide a summary of the industries in which the former entrepreneurs ran firms, but they provide some examples, including businesses on college campuses, food service or retail companies, and software firms.

entrepreneurs whose firms were in the top 10% of entry year employment; since Harvard MBAs are likely relatively successful as entrepreneurs, entrepreneurs who start large firms in my data may be a similar group. Second, I seek a group similar to the Harvard MBAs in a way unrelated to entrepreneurial success. While the LEHD demographics data does contain information on education, it is only available for a small fraction of individuals and is very coarse, with the highest level of education recorded being college; this makes using education as a proxy for like-MBA status impractical. Instead, I focus on earnings and investigate whether individuals experience entrepreneurial spillovers from their entrepreneurial coworkers who earn above $100,000 (in 2010 USD).[36]

I investigate whether these "like-Harvard MBA" entrepreneurs discourage their coworkers from becoming entrepreneurs by estimating versions of model (1) in which I additionally consider exposure to successful and high-earning entrepreneurial coworkers. As columns 2 and 3 of Table OA.27 show, exposure to these types of entrepreneurial coworkers marginally pushes individuals towards entrepreneurship (i.e., the coefficients on the shares are positive), such that there is no evidence that these groups on net discourage entrepreneurship.

Yet, it is possible that these "like-Harvard MBA" entrepreneurial coworkers discourage ventures that are unlikely to succeed, as Lerner and Malmendier (2013) argue. To investigate this, I re-estimate my modified versions of model (1) and I integrate into the outcome variable a measure of firm success, similar to how Lerner and Malmendier (2013) study future entrepreneurial success. First, I study whether these "like-Harvard MBAs" encourage or prompt successful entrepreneurship. I estimate models in which the dependent variable is an indicator equal to 1 if an individual becomes an entrepreneur in the next five years *and* their entrepreneurial firm has entry year log employment in the top 10%, relative to firms that enter in the same year and industry, and 0 otherwise. The estimates of these regressions, shown in columns 4-6 of Table OA.27, reflect the patterns previously documented in this section: individuals who are exposed to more entrepreneurs

[36] In the 2005 Current Population Survey (CPS), 6.6% of individuals with positive 2004 income and wages report earning above $100,000 (in 2010 USD). Among individuals with at least a bachelor's degree, this share is, as expected, higher: 17.5%; among individuals with at least a master's degree, the share is again higher: 26.3%. I source CPS data from IPUMS (Flood et al. (2020)).

in general tend to be less likely to start firms that are particularly large, while those exposed to the "like-Harvard MBA" entrepreneurial coworkers are more likely to start firms that are particularly large.

Next, I study whether the "like-Harvard MBAs" discourage unsuccessful entrepreneurship. I estimate models in which the dependent variable is an indicator equal to 1 if an individual becomes an entrepreneur in the next five years *and* their entrepreneurial firm has entry year log employment in the bottom 90%, relative to firms that enter in the same year and industry, and 0 otherwise. The estimates of these regressions, shown in columns 7-9 of Table OA.27, show some evidence of dissuasion. Individuals who are exposed to more entrepreneurs in general are more likely to start unsuccessful firms, but this is partially offset if those entrepreneurial coworkers started particularly large firms or are high earners.

These patterns suggest that, as Lerner and Malmendier (2013) argue, there is some scope for former entrepreneurs to discourage future entrepreneurship, particularly less successful future entrepreneurship. However, these patterns are restricted to particular circumstances and may only be relevant for individuals who work with special coworkers. The vast majority of the population does not work with Harvard MBA-type coworker, and so my findings may be more relevant in the broad context.

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Table OA.1: Exposure to any entrepreneurial coworkers predicts entrepreneurship, particularly at smaller establishments

| Dependent Variable: | Entrepreneur 2005-2009 |
|---|---|
| | (1) |
| Any coworkers with entrepreneurship $\times$ Emp $\in [0,24]$ | 0.006*** |
| | (0.000) |
| Any coworkers with entrepreneurship $\times$ Emp $\in [25,99]$ | 0.005*** |
| | (0.000) |
| Any coworkers with entrepreneurship $\times$ Emp $\in [100,\infty)$ | 0.003*** |
| | (0.000) |
| $\mathbb{1}\{\text{Emp} \in [0,24]\}$ | x |
| $\mathbb{1}\{\text{Emp} \in [25,99]\}$ | x |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that extensive margin spillovers are not driven by the linear-in-means functional for of model (1); rather, individuals who work with *any* entrepreneurial coworkers, particularly those at smaller establishments, are more likely to become entrepreneurs. The table present estimates of (1) where I replace the variable on the share of coworkers with entrepreneur experience with variables on whether the individual has any entrepreneurial coworkers interacted with the establishment's size (only counting individuals for whom the establishment is their primary establishment), with controls indicated in the footer (mindicators for being in each establishment employment bin).

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N=46,680,000. Mean (dep var): 0.031. 21.4% of individuals are in establishments with 24 or fewer employees; 18.6% are in establishments with 25-99 employees; 60.0% are in establishments with 100+ employees.

Table OA.2: Extensive margin spillovers: Exposure to entrepreneurial coworkers predicts future entrepreneurship, controlling flexibly for employment

| | Dependent Variable: Entrepreneur 2005-2009 | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Share of coworkers with entrepreneurship | 0.025*** | 0.014*** | 0.013*** |
| | (0.001) | (0.001) | (0.001) |
| Employment bins fixed effects | | x | |
| Employment fixed effects | | | x |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence of positive extensive margins spillovers, controlling more flexibly for 2004 establishment employment than in Table 2. The table presents regressions performed on the sample of individuals in 2004. The columns present estimates of model (1), with additional employment controls indicated in the footer. Column 1 replicates column 5 of Table 2. Column 2 adds fixed effects for bins of establishment employment; these bins split establishments based on employment in the following groups: employment less than 5; between 5 and 10, 11 and 25, 26 and 50, 51 and 75, 76 and 100, 101 and 150, 151 and 200, 201 and 250, 251 and 500, 501 and 1,000, 1,001 and 5,000, 5,001 and 10,000; and greater than 10,000. Column 3 instead includes employment fixed effects (note, for some establishments with unique employment values, this amounts to establishment fixed effects).

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N=46,680,000. Mean of dependent variable: 0.031. Mean (std dev) of share of coworkers with entrepreneurship: 0.034 (0.095).

Table OA.3: Extensive margin spillovers are largest from establishment coworkers, rather than from other firm employees

| | Dependent Variable: Entrepreneur 2005-2009 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample: | Main | | | Multi-estab. | | Multi-estab.: 2+ Sectors | | Multi-estab.: 2+ States | |
| Other-establishment coworkers: | | | | All | | Same State, Other Sector | | Same Sector, Other State | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Share of establishment coworkers with entr. | 0.025*** | | 0.024*** | 0.098*** | 0.092*** | 0.140*** | 0.139*** | 0.101*** | 0.097*** |
| | (0.001) | | (0.003) | (0.003) | (0.003) | (0.007) | (0.007) | (0.004) | (0.004) |
| Share of firm workers with entr. | | 0.026*** | -0.000 | | | | | | |
| | | (0.001) | (0.003) | | | | | | |
| Share of other-establishment workers with entr. | | | | | 0.010*** | | 0.005*** | | 0.010*** |
| | | | | | (0.002) | | (0.001) | | (0.002) |
| Log employment | x | | x | x | x | x | x | x | x |
| Log employment, firm | | x | | | | | | | |
| Log employment, other estabs. | | | | | x | | x | | x |
| Other model (1) controls | x | x | x | x | x | x | x | x | x |
| Mean(dep var) | | 0.031 | | 0.019 | | 0.016 | | 0.019 | |
| Mean(new indep var) | 0.034 | 0.034 | | 0.014 | 0.018 | 0.011 | 0.020 | 0.014 | 0.017 |
| Std dev(new indep var) | 0.095 | 0.094 | | 0.027 | 0.056 | 0.016 | 0.064 | 0.024 | 0.053 |
| N | | 46,680,000 | | 24,030,000 | | 10,890,000 | | 19,630,000 | |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that extensive margin spillovers are concentrated amongst workers in the *same* establishment within a firm. The table present regressions performed on the sample of individuals in 2004 (in columns 1-3) and subsamples of these individuals at multiple-establishment (SEIN) firms (in columns 4-9). The columns present estimates of an augmented model (1) where I consider exposure to coworkers at both the same of different establishments in the same firm. All columns include the other standard controls (own recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects). Standard errors are robust and clustered at the establishment (SEIN) level in all columns except (2), where they are clustered at the firm level. Note that for defining the set of establishments considered in columns 6-9, "sector" indicates 2-digit NAICS. Columns 6-7 compare an individual's establishment coworkers to employees at their firm in other establishments located in the same state, but different sector. Columns 8-9 compare an individual's establishment coworkers to employees at their firm in other establishments located in the same sector, but different state.

Table OA.4: Extensive margin spillovers: Exposure to entrepreneurial coworkers predicts future entrepreneurship, controlling for growth

| | Dependent Variable: Entrepreneur 2005-2009 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Growth from __ year(s) ago: | 5 | | 4 | | 3 | | 2 | | 1 | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Share of cow. | 0.023*** | 0.032*** | 0.024*** | 0.025*** | 0.024*** | 0.023*** | 0.024*** | 0.022*** | 0.025*** | 0.024*** |
| with entr. | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| DHS emp. | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.000** | 0.000 |
| growth | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Share × DHS | | -0.005*** | | -0.001 | | 0.001*** | | 0.003*** | | 0.013*** |
| growth | | (0.001) | | (0.001) | | (0.001) | | (0.001) | | (0.001) |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence of positive extensive margins spillovers, controlling for 2004 establishment growth, suggesting that results are not driven by establishments experience different growth patterns. The table presents regressions performed on the sample of individuals in 2004. The columns present estimates of model (1), with additional controls for establishment employment growth from previous years to 2004 as well as the interaction of the exposure to entrepreneurial coworkers with this growth. The table considers growth from up to 5 years prior to 2004 to 2004, as indicated in the header. Employment growth is measured as DHS growth, which is computed as the difference between establishment employment in 2004 and employment in a prior year, divided by the average of these two values (Davis, Haltiwanger, and Schuh (1996)); these growth measures take on values between -2 and 2, taking on value 2 if an establishment had zero employment in the prior year.

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N = 46,680,000. Mean of dependent variable: 0.031. Mean (std dev) of share of coworkers with entrepreneurship: 0.034 (0.095). Mean (std dev) of DHS establishment employment growth from 5 years ago: 0.802 (0.954); from 4 years ago: 0.678 (0.930); from 3 years ago: 0.547 (0.878); from 2 years ago: 0.364 (0.755); from 1 year ago: 0.209 (0.591).

Table OA.5: Extensive margin spillovers: Exposure to entrepreneurial coworkers predicts future entrepreneurship, controlling for firm productivity and revenue

| | Dependent Variable: Entrepreneur 2005-2009 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Share of coworkers with entrepreneurship | 0.025*** | 0.018*** | 0.024*** | -0.022*** |
| | (0.001) | (0.000) | (0.001) | (0.000) |
| Productivity | -0.001*** | -0.001*** | | |
| | (0.000) | (0.000) | | |
| Productivity × Share | | 0.001*** | | |
| | | (0.001) | | |
| Log revenue | | | -0.001*** | -0.001*** |
| | | | (0.000) | (0.000) |
| Log revenue × Share | | | | 0.006*** |
| | | | | (0.000) |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence of positive extensive margins spillovers, controlling for 2004 firm success measures (productivity and revenue). The table presents regressions performed on the sample of individuals in 2004. The columns present estimates of model (1), adding controls and interactions of the exposure to entrepreneurial coworkers with an individual's 2004 firm's productivity (log revenue/employment) or log revenue. Columns 1 and 3 demonstrate that the positive spillovers presented in Table 2 persist when controlling for these employer success measures; columns 2 and 4 show that spillovers may be stronger at more successful employers. These productivity and revenue measures are sometimes unavailable for some firms; in these cases, I replace the measure with the worker-weighted mean of the variable and include as a control an indicator equal to 1 if the variable was missing, 0 otherwise.

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N = 46,680,000. Mean of dependent variable: 0.031. Mean (std dev) of share of coworkers with entrepreneurship: 0.034 (0.095). Mean (std dev) of productivity: 4.855 (1.171); of log revenue: 11.39 (3.706). Note that the negative coefficient on exposure to entrepreneurial coworkers in column 4 reflects the fact that log revenue is not close to zero; even at two standard deviations below mean log revenue, the marginal effect of having more entrepreneurial coworkers — i.e., the sum of the coefficient on the share alone (-0.022) and the implied additional effect from the interaction of the share and log revenue ($(11.39 - 2 \times 3.706) \times 0.006$) — is positive. (If I standardize log revenue before estimating the model in column 4, the coefficient on the share alone is positive.)

Table OA.6: Extensive margin spillovers: Exposure to entrepreneurial coworkers predicts future entrepreneurship, controlling for local entrepreneurship

| | Dependent Variable: Entrepreneur 2005-2009 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Share of coworkers with entrepreneurship | 0.025*** | 0.011*** | 0.025*** | 0.026*** |
| | (0.001) | (0.002) | (0.001) | (0.001) |
| State entrepreneurship rate | (collinear with state FEs) | (collinear with state FEs) | | |
| State entr. rate × Share | | 1.420*** | | |
| | | (0.255) | | |
| State-by-sector entrepreneurship rate | | | 0.554*** | 0.562*** |
| | | | (0.028) | (0.029) |
| State-sector entr. rate × Share | | | | -0.133 |
| | | | | (0.082) |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence of positive extensive margins spillovers, controlling for 2004 local entrepreneurship. The table presents regressions performed on the sample of individuals in 2004. The columns present estimates of model (1), adding controls and interactions of the exposure to entrepreneurial coworkers with an individual's 2004 local entrepreneurship rate. In columns 1 and 2, the local entrepreneurship rate is the 2004 entrepreneurship rate (i.e., what share of individuals are currently entrepreneurs in 2004) in an individual's state; in columns 3 and 4, the local entrepreneurship rate is measured at the state-by-sector (NAICS2) 2004 entrepreneurship rate, for the sector in which an individual works in 2004. Columns 1 and 3 demonstrate that the positive spillovers presented in Table 2 persist when controlling for these local entrepreneurship rate measures (note that column 1 is column 5 from Table 2, as state entrepreneurship rates are collinear with state fixed effects); columns 2 and 4 show that spillovers may be stronger in states experiencing higher entrepreneurship rates but not necessarily stronger in state-sector pairs experiencing higher entrepreneurship rates.

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N = 46,680,000. Mean of dependent variable: 0.031. Mean (std dev) of share of coworkers with entrepreneurship: 0.034 (0.095). Mean (std dev) of state entrepreneurship: 0.009 (0.002); of state-by-NAICS2 entrepreneurship: 0.009 (0.005).

Table OA.7: Extensive margin spillovers are strongest for top three quartiles of earners

| | Dependent Variable: Entrepreneur 2005-2009 | |
|---|---|---|
| | (1) | (2) |
| Share of coworkers w/ entrepreneurship | 0.008*** | -0.001 |
| × Earnings in lowest quartile | (0.001) | (0.001) |
| Share of coworkers w/ entrepreneurship | 0.031*** | 0.015*** |
| × Earnings in second lowest quartile | (0.001) | (0.001) |
| Share of coworkers w/ entrepreneurship | 0.030*** | 0.052*** |
| × Earnings in second highest quartile | (0.001) | (0.001) |
| Share of coworkers w/ entrepreneurship | 0.038*** | 0.037*** |
| × Earnings in highest quartile | (0.001) | (0.001) |
| Earnings quartile FE | x | x |
| Quartile relative to | Economy | Establishment |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that extensive margin spillovers are commonplace across the earnings distribution. The table presents regression estimates of model (1) performed on the sample of individuals in 2004, with the share variable broken out into mutually-exclusive bins based on the individual's 2004 earnings quartile (either relative to the whole economy, in column 1, or their establishment, in column 2) with controls indicated in the footer. All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N=46,680,000. For relative to the economy, mean (std dev) of share w/ entrepreneurship and ... lowest quartile is 0.009 (0.053); second lowest is 0.010 (0.057); second highest is 0.008 (0.048); and highest is 0.006 (0.039). For relative to the establishment, mean (std dev) of share w/ entrepreneurship and ... lowest quartile is 0.007 (0.036); second lowest is 0.010 (0.061); second highest is 0.008 (0.041); and highest is 0.010 (0.057).

Table OA.8: Entrepreneurial coworkers push entrepreneurs towards some sectors, away from others

| | Dependent Variable: Entrepreneurial Firm in Sector | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| | Agriculture | | Mining | | Utilities | | Construction | | Manufacturing | |
| Share of coworkers w/ entrepreneurship | 0.001*** | 0.001*** | 0.000 | 0.000 | -0.000 | -0.000 | 0.000 | -0.004** | -0.004*** | -0.003*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.002) | (0.002) | (0.001) | (0.001) |
| Share of coworkers w/ entr. in sector (not estab.'s) | | -0.007 | | -0.009*** | | -0.001 | | 0.293*** | | -0.041 |
| | | (0.004) | | (0.003) | | (0.002) | | (0.027) | | (0.037) |
| Mean(dep var) | 0.004 | 0.004 | 0.003 | 0.003 | 0.007 | 0.007 | 0.142 | 0.142 | 0.041 | 0.041 |
| | Wholesale | | Retail | | Transport/Warehous. | | Information | | Finance/Insurance | |
| Share of coworkers w/ entrepreneurship | 0.006*** | 0.008*** | 0.002 | 0.002 | 0.000 | 0.001 | -0.001 | -0.000 | 0.003** | 0.004*** |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Share of coworkers w/ entr. in sector (not estab.'s) | | -0.095*** | | 0.012 | | -0.047*** | | -0.035*** | | -0.097*** |
| | | (0.017) | | (0.020) | | (0.008) | | (0.008) | | (0.012) |
| Mean(dep var) | 0.051 | 0.051 | 0.112 | 0.112 | 0.033 | 0.033 | 0.015 | 0.015 | 0.046 | 0.046 |
| | Real Estate/Licensing | | Pro/Sci/Tech Serv. | | Management | | Admin | | Education | |
| Share of coworkers w/ entrepreneurship | 0.001 | 0.003** | -0.000 | -0.004** | 0.001** | 0.001*** | -0.003** | -0.001 | -0.000 | 0.000 |
| | (0.001) | (0.001) | (0.002) | (0.002) | (0.000) | (0.000) | (0.001) | (0.001) | (0.001) | (0.001) |
| Share of coworkers w/ entr. in sector (not estab.'s) | | -0.115*** | | 0.269*** | | -0.020*** | | -0.101*** | | -0.048*** |
| | | (0.012) | | (0.024) | | (0.001) | | (0.014) | | (0.005) |
| Mean(dep var) | 0.044 | 0.044 | 0.131 | 0.131 | 0.003 | 0.003 | 0.063 | 0.063 | 0.012 | 0.012 |
| | Health | | Arts/Entertainment | | Accomm./Food | | Other Services | | | |
| Share of coworkers w/ entrepreneurship | -0.003** | -0.003* | 0.001* | 0.002** | -0.006*** | -0.008*** | 0.000 | 0.000 | | |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.002) | (0.001) | (0.001) | | |
| Share of coworkers w/ entr. in sector (not estab.'s) | | -0.054*** | | -0.045*** | | 0.126*** | | 0.013 | | |
| | | (0.013) | | (0.008) | | (0.017) | | (0.013) | | |
| Mean(dep var) | 0.097 | 0.097 | 0.020 | 0.020 | 0.113 | 0.113 | 0.072 | 0.072 | | |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that exposure to entrepreneurial coworkers may predict in which sector an individual starts a firm, particularly if those coworkers ran firms in those sectors, suggesting that some spillovers may convey industry-specific information. The table presents regressions performed on the sample of individuals in 2004 who become entrepreneurs between 2005 and 2009. The columns present estimates of versions of model (2) for whether the entrepreneurs start firms in each sector. Even columns add as a covariate the share of coworkers who were entrepreneurs in the given column's sector *if* the individual's 2004 establishment is not in that sector (and 0 otherwise). All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N=1,456,000. Mean (std dev) of share of coworkers w/ entrepreneurship is 0.064 (0.147).

Table OA.9: Extensive margin spillovers are stronger among coworkers with similar earnings

| | Dependent Variable: Entrepreneur 2005-2009 | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Share of coworkers with entrepreneurship | 0.026*** | 0.024*** | |
| | (0.001) | (0.001) | |
| Share of coworkers with entrepreneurship and in the same earnings quartile | | 0.034*** | |
| | | (0.002) | |
| Share of coworkers with entrepreneurship and in lowest quartile | | | 0.082*** |
| | | | (0.003) |
| Share of coworkers with entrepreneurship and in second lowest quartile | | | 0.012*** |
| | | | (0.001) |
| Share of coworkers with entrepreneurship and in second highest quartile | | | 0.047*** |
| | | | (0.002) |
| Share of coworkers with entrepreneurship and in highest quartile | | | 0.024*** |
| | | | (0.001) |
| Within-establishment earnings bin FE | x | x | |
| Share of coworkers in each earnings bin | | x | x |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that extensive margin spillovers are amplified when entrepreneurial coworkers have similar earnings to an individual, and thus are more likely to belong to the same occupation and/or work group. While individuals may learn entrepreneurship from coworkers in any quartile of the within-establishment earnings distribution, they are disproportionately likely to become entrepreneurs when their entrepreneurial coworkers fall in the same earnings quartile as them. This table presents regression estimates of model (1), expanded to consider in which within-establishment earnings quartiles the coworkers fall (relative to the individual), performed on the sample of individuals in 2004.

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N=46,680,000. Mean of dep var: 0.034. In columns 1 and 2, mean (std dev) of share of coworkers with entrepreneurship: 0.034 (0.095). In column 2, In column 3, mean (std dev) of share ... and same quartile: 0.006 (0.029). In column 3: mean (std dev) of share ... and lowest quartile: 0.004 (0.016); second lowest quartile: 0.007 (0.042); second highest quartile: 0.007 (0.031); highest quartile: 0.016 (0.066).

Table OA.10: Entrepreneurial coworkers' success predicts future entrepreneurship

| | Dependent Variable: Entrepreneur 2005-2009 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Share of coworkers with entrepreneurship | 0.025*** | | 0.025*** | | 0.025*** | | 0.024*** | | 0.023*** |
| | (0.001) | | (0.001) | | (0.001) | | (0.001) | | (0.001) |
| Additional effects: | | | | | | | | | |
| Share of coworkers with entr. and top 10% employment | | 0.039*** | 0.021*** | | | | | | |
| | | (0.002) | (0.002) | | | | | | |
| Share of coworkers with entr. and top 10% payroll | | | | 0.023*** | 0.004** | | | | |
| | | | | (0.002) | (0.002) | | | | |
| Share of coworkers with entr. and top 10% revenue | | | | | | 0.042*** | 0.024*** | | |
| | | | | | | (0.002) | (0.002) | | |
| Share of coworkers with entr. and top 10% revenue/employment | | | | | | | | 0.041*** | 0.022*** |
| | | | | | | | | (0.002) | (0.002) |
| Mean(share entr., top 10%) | | 0.005 | 0.005 | 0.005 | 0.005 | 0.003 | 0.003 | 0.002 | 0.002 |
| Std dev(share entr., top 10%) | | 0.025 | 0.025 | 0.029 | 0.029 | 0.023 | 0.023 | 0.026 | 0.026 |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence of exposure to successful entrepreneurial coworkers amplifying the positive extensive margin spillovers. The columns present estimates of several adaptations of model (1) with different measures of entrepreneurial coworkers' success. "Share of coworkers with entr. and top 10% employment," e.g., is the share of coworkers who were recently entrepreneurs and whose entrepreneurial firms was in the top 10% of entry year employment, amongst firms that entered in the same year and industry. Column 1 presents the main baseline results from column 5 of Table 2 for comparison.

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N = 46,680,000. Mean of dep var is 0.031. Mean (std dev) of share of coworkers with entrepreneurship is 0.034 (0.095).

Table OA.11: Spillovers depend on relative age and own entrepreneurial experience

| | Dependent Variable: Entrepreneur 2005-2009 (1) |
|---|---|
| Panel A: Spillovers strongest from *relatively* older entrepreneurial coworkers | |
| Share of coworkers with entrepreneurship and younger | 0.016*** |
| | (0.001) |
| Share of coworkers with entrepreneurship and same age | 0.020*** |
| | (0.001) |
| Share of coworkers with entrepreneurship and older | 0.033*** |
| | (0.001) |
| Panel B: Spillovers lead to *new* entrepreneurs | |
| Share of coworkers with entrepreneurship | 0.042*** |
| | (0.001) |
| Previous entrepreneur | 0.039*** |
| | (0.000) |
| Share of coworkers with entrepreneurship × Previous entrepreneur | -0.049*** |
| | (0.001) |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that extensive margin spillovers are strongest when coworkers are relatively older (Panel A) and when the individual has no recent entrepreneurial experience (Panel B). The table presents regression estimates of adapted versions of model (1) performed on the sample of individuals in 2004. Panel A replaces as the main explanatory variable the share of coworkers with recent entrepreneurship with three variables: the share of coworkers with entrepreneurial experience *and* who are younger than the individual, the share of coworkers with entrepreneurial experience *and* who are the same age as the individual, and the share of coworkers with entrepreneurial experience *and* who are older than the individual; the regressions also include controls for the share of all coworkers who are younger, the same age, and older than the individual. I bin an individual's coworkers into three bins based on the relative ages: those "younger" than the individual (i.e., between age 20 and their age minus 3, inclusively); those the "same age" as their (i.e., between their age minus 2 and their age plus 2, inclusively); and those "older" than their (i.e., between their age plus 3 and 69, inclusively). Panel B includes the interaction of the individual's own previous entrepreneurship with the share of their coworkers who were recently entrepreneurs. (Note that Panel B explicitly presents the coefficient on previous entrepreneurship, while that coefficient is suppressed in other tables.)

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N = 46,680,000. Mean (std dev) of: share of coworkers with entrepreneurship and younger = 0.020 (0.053); share of coworkers with entrepreneurship and same age = 0.005 (0.039); share of coworkers with entrepreneurship and older = 0.0164 (0.064).

Table OA.12: Previous entrepreneurs vary in success, but many entrepreneurial coworkers were unsuccessful

| | Previous Entrepreneur *Coworkers* | | *All* Previous Entrepreneurs | |
|---|---|---|---|---|
| | Mean (1) | Std Dev (2) | Mean (3) | Std Dev (4) |
| Entrepreneur of current firm | 0.087 | 0.271 | 0.517 | 0.500 |
| Firm survived to age 5 | 0.450 | 0.307 | 0.620 | 0.485 |
| Entrepreneur at firm at age 5 | 0.117 | 0.245 | 0.374 | 0.484 |
| Top 10% entry year employment | 0.154 | 0.239 | 0.156 | 0.363 |
| payroll | 0.126 | 0.230 | 0.154 | 0.361 |
| revenue | 0.068 | 0.170 | 0.084 | 0.278 |
| revenue productivity | 0.051 | 0.135 | 0.063 | 0.242 |
| N | 36,310,000 | | 1,573,000 | |

Note: This table presents entrepreneurial characteristics of individuals who became entrepreneurs between 1999 and 2003 and shows that these entrepreneurs vary in their past success, with the average set of entrepreneurial coworkers comprising relatively unsuccessful entrepreneurs who now work in other firms. Columns 1 and 2 present characteristics of entrepreneurial coworkers, for individuals in 2004 who have at least one previous entrepreneur as a coworker; specifically, these values are the summary statistics for the share of coworkers who satisfy some characteristic. These columns describe the average "treatment" that individuals face in the workforce. Columns 3 and 4 present characteristics of all previously entrepreneur individuals, serving as a benchmark for the success of average entrepreneurs; many of these individuals started their current firm. Top 10% measures are based on 90th percentile thresholds estimated at the entry year-industry (NAICS6) level; note that because there can be up to three entrepreneurs per firm, more than 10% of *entrepreneurs* can start *firms* that are in the top 10% of entry year log employment, etc.

Table OA.13: Additional robustness to intensive margin spillovers

| | Dependent Variable: 2005-2009 Entrepreneurial Firm Survives to Age 2 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Share of coworkers with entr. | -0.009*** | -0.033*** | -0.010*** | -0.039*** | -0.009*** | -0.032*** | -0.038*** | -0.039*** |
| | (0.003) | (0.011) | (0.003) | (0.011) | (0.002) | (0.011) | (0.011) | (0.011) |
| Share of coworkers with entr. and survived to age 2 | | 0.025** | | 0.032*** | | 0.024** | 0.030*** | 0.031*** |
| | | (0.011) | | (0.011) | | (0.011) | (0.011) | (0.011) |
| Entr. industry FE | | x | x | | | | | |
| Entry year FE | | | x | x | | | | |
| Entr. ind.-Entry year FE | | | | | x | x | | |
| $\mathbb{1}\{$Missing rev.$\}$ | | | | | | | x | x |
| Firm log revenue | | | | | | | x | |
| Firm log rev./emp. | | | | | | | | x |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that the intensive margin spillovers (in particular, those measured in terms of firm survival, i.e., columns 1-2 of Table 7) are robust to several specification extensions. The table presents regressions performed on the sample of individuals who become entrepreneurs between 2005 and 2009. The columns present estimates of several adaptations of model (2) for the outcome of whether an individual's entrepreneurial firm survives to a second year, with different controls, as indicated in the footer. "Entr. industry FE" indicates fixed effects for the future entrepreneur's firm's entry year 6-digit industry; "Entry year FE" indicate fixed effects for the future entrepreneur's firm's entry year. "Entr. instury-Entry year FE" indicate the entrepreneurs' industry-by-entry year fixed effects. In the final two columns, firms with missing revenue information (i.e., does not have LBD revenue data) have revenue or productivity values replaced by the mean; this is controlled for with a missing indicator.

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N = 1,456,000. Mean of dep var is 0.815. Mean (std dev) of share of coworkers with entrepreneurship is 0.064 (0.147); mean (std dev) of share of coworkers with entrepreneurship and whose entrepreneurial firm survived to age 2 is 0.057 (0.143).

Table OA.14: Entrepreneurial coworkers' success predicts future entrepreneurs' success

| | Dependent Variable: Entrepreneurial Firm in Top 10% | | | | | |
|---|---|---|---|---|---|---|
| | Log(Payroll) | | Log(Revenue) | | Log(Rev/Emp) | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Panel A: Without entrepreneurial firm industry fixed effects | | | | | | |
| Share of coworkers with | -0.080*** | -0.101*** | -0.022*** | -0.034*** | 0.014*** | 0.003 |
| entrepreneurship | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| Additional effect: | | | | | | |
| Share of coworkers with entr. | | 0.238*** | | 0.202*** | | 0.125*** |
| and top 10% | | (0.010) | | (0.010) | | (0.008) |
| Panel B: With entrepreneurial firm industry fixed effects | | | | | | |
| Share of coworkers with | -0.080*** | -0.102*** | -0.022*** | -0.034*** | 0.014*** | 0.003* |
| entrepreneurship | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| Additional effect: | | | | | | |
| Share of coworkers with entr. | | 0.282*** | | 0.204*** | | 0.126*** |
| and top 10% | | (0.010) | | (0.010) | | (0.008) |
| Entr. industry FE | x | x | x | x | x | x |
| Mean(dep var) | 0.164 | 0.164 | 0.083 | 0.083 | 0.057 | 0.057 |
| Mean(share entr., 10%) | | 0.009 | | 0.006 | | 0.005 |
| Std dev(share entr., 10%) | | 0.044 | | 0.038 | | 0.045 |

Note: This table presents additional evidence of intensive margin spillovers depending on the relative success of entrepreneurial coworkers. The table presents regressions performed on the sample of individuals who become entrepreneurs between 2005 and 2009. The columns present estimates of (2) for different measures of firm success, with controls indicated in the footer; the covariate "Share of coworkers with entr. and top 10%" is the share of coworkers who were recently entrepreneurs and whose firm was in the top 10% of firms that entered in the same year and 6-digit industry in terms of the dependent variable outcome (i.e., in column 1, this share is in terms of entry year log employment).

In all columns, the dependent variables are indicators equal to 1 if the firm was in the top 10% of the listed measure, amongst firms that entered in the same year and industry, and 0 otherwise. Revenue and productivity (revenue/employment) measures are based on LBD data; if an entrepreneur's firm does not appear in the LEHD, they are coded as not being in the top 10% (although the top 10% threshold is based only on the firms with LBD data).

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors in parentheses are robust and clustered at the establishment level. N = 1,456,000. Mean (std dev) of the share of coworkers with entrepreneurship is 0.064 (0.147).

Table OA.15: Additional robustness to entrepreneurship measurement

| | Dependent Variable: Entrepreneur 2005-2009 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Share of coworkers with entrepreneurship | 0.025*** | 0.025*** | 0.021*** | 0.023*** | 0.022*** | 0.015*** | 0.023*** | 0.025*** | 0.004*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.000) |
| Entrepreneurship definition | Main | LEHD Age | Top 1 | Top 2 | First Q | Corp-orations | Sole Prop-rietorships | Partner-ships | Other Leg-al Form |
| Mean(dep var) | 0.031 | 0.026 | 0.014 | 0.024 | 0.029 | 0.021 | 0.005 | 0.007 | 0.002 |
| Mean(share) | 0.034 | 0.029 | 0.014 | 0.025 | 0.030 | 0.024 | 0.006 | 0.005 | 0.006 |
| Std Dev(share) | 0.095 | 0.088 | 0.059 | 0.083 | 0.090 | 0.083 | 0.038 | 0.033 | 0.036 |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that the extensive margin spillovers are robust to varying the definition of entrepreneurship. The columns present estimates of several adaptations of model (1). Column 1 provides the baseline estimate from Table 2 for comparison. In column 2, I define entrepreneurship (for both the dependent and independent variables, including the unreported controls of own recent entrepreneurship) as being one of the top 3 annual earners at a firm at LEHD firm age 0 (based on an calculation of firm age provided by the Census). In columns 3 and 4, I define entrepreneurship as being the top annual earner or top 2 annual earners at a new firm, respectively, based on my definition of firm entry (based on entry to the LEHD and LBD). In column 5, I alternatively define entrepreneurship as being at the firm, regardless of amount of earnings, in the first quarter in which the firm has any earners. In columns 6-9, I define entrepreneurship as being one of the top 3 annual earners at a new firm of a given legal type; I identify firms' legal types from the Business Register (BR), and label a firm as a corporation, sole proprietorship, partnership, and/or other legal form if it is ever labeled as such in the 1994-2013 BR. Note that of all the legal types, entrepreneurs at corporations are most likely to be true firm owners; owners of sole proprietorship and partnerships are generally not supposed to take wage and salary income and thus should not appear in the LEHD.

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N=46,680,000.

Table OA.16: Extensive margin spillovers exist regardless of when coworkers joined firm

| | Dependent Variable: Entrepreneur 2005-2009 (1) |
|---|---|
| Share of coworkers with entrepreneurship and joined before | 0.036*** |
| | (0.001) |
| Share of coworkers with entrepreneurship and joined in same year | 0.005*** |
| | (0.001) |
| Share of coworkers with entrepreneurship and joined after | 0.074*** |
| | (0.002) |
| Share of coworkers who joined in each year, 1994-2004 | x |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that the extensive margin spillovers exist regardless of when the entrepreneurial coworkers joined the firm, relative to the individual, including coworkers who joined after them (i.e., who the individual should not have selected on when joining). The table presents regression estimates of model (1), breaking out the share of coworkers who were recently entrepreneurs into three categories based on whether the coworkers joined before, in the same year, or after the individual, performed on the sample of individuals in 2004, with controls indicated in the footer.

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N=46,680,000. Mean of dep var is 0.034. Mean (std dev) of share entr. and . . . joined before is 0.013 (0.061); joined in the same year is 0.014 (0.070); and joined after is 0.007 (0.024).

Table OA.17: Having entrepreneurial coworkers is not a compensating differential for the average new hire

| | Dependent Variable: Log 2004 Earnings | |
|---|---|---|
| | (1) | (2) |
| Share of coworkers with entrepreneurship | 0.084*** | 0.151*** |
| | (0.024) | (0.021) |
| Model (1) controls | x | x |
| Log 2003 total earnings | | x |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence against the idea that individuals seek out and pay for the opportunity to work with entrepreneurial coworkers. The table presents regressions performed on the sample of individuals who are new hires at their firm in 2004. The columns present estimates of several adaptations of model (1) with different controls, as indicated in the footer, where I replace the dependent variable with the individual's log earnings at their firm in 2004. In column 2, I control for the individual's log total earnings in 2003, summing across all employers; if an individual does not have 2003 earnings, I replace this value by the mean and control for this using an indicator.

All columns include model (1) controls *except* log earnings (log employment, recent entrepreneurship, demographics, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N=13,970,000. Mean of the dependent variable is 9.756. Mean (std dev) of share of coworkers who were recently entrepreneurs is 0.035 (0.089).

Table OA.18: Exposure to entrepreneurial coworkers predicts timing of entrepreneurship *within*-individual

| Dependent Variable: | Entrepreneur Next Year | |
|---|---|---|
| | (1) | (2) |
| Share of coworkers with entrepreneurship | 0.006*** | 0.014*** |
| | (0.001) | (0.001) |
| Year FEs | x | x |
| Person FEs | | x |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that extensive margin spillovers hold even *within*-individual. The table presents regressions performed on the sample of individuals who work at least twice between 1999 and 2008 and who become entrepreneurs at least once between 2000 and 2009 (and who at least once between 1999 and 2008 do not become entrepreneurs in the following year; i.e., individuals with variation in future entrepreneurship). This sample allows me to measure how exposure to entrepreneurial coworkers predicts the *timing* of entrepreneurship within an individual, captured with the inclusion of person fixed effects. The table present estimates of (1) for this sample, where I add person fixed effects in column 2. The dependent variable is an indicator equal to 1 if an individual becomes an entrepreneur within 1 year, and 0 otherwise; this outcome is chosen instead of within 5 years in order to remove mechanical dependence in outcomes within an individual.

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N = 21,760,000. Mean of dependent variable: 0.140. Mean (std dev) of share of coworkers with entrepreneurship: 0.091 (0.188).

Table OA.19: Additional robustness to extensive margin spillovers: Single-location establishments

| | Dependent Variable: Entrepreneur 2005-2009 | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Share of coworkers with entrepreneurship | 0.013*** | 0.013*** | 0.019*** |
| | (0.001) | (0.001) | (0.001) |
| Log employment | x | x | x |
| Own entrepreneurship | x | x | x |
| Demographics | x | x | x |
| Log annual earnings | x | x | x |
| Age FE | x | x | x |
| Industry FE | x | x | |
| State FE | x | x | x |
| ZIP code FE | | x | |
| Zip code-Industry FE | | | x |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents additional evidence that the extensive margin results are robust to including finer geographic and geographic-by-industry fixed effects. The table presents regressions performed on the sample of individuals that (a) are single-location establishments (i.e., the SEIN has one "SEIN-unit") and (b) are mappable to a physical establishment in the LBD from which I can identify the establishment's ZIP code. The columns present estimates of several adaptations of model (1) with different controls, as noted in the footer.

Standard errors are robust and clustered at the establishment level. N=20,200,000. Mean of the dependent variable is 0.044. Mean (std dev) of share of coworkers who were recently entrepreneurs is 0.055 (0.131).

Table OA.20: Extensive margin spillovers exist, but are not only, from very recent entrepreneurs

| | Dependent Variable: Entrepreneur 2005-2009 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Share of coworkers with entrepreneurship | 0.024*** | 0.024*** | 0.025*** | 0.025*** | 0.025*** | 0.026*** | 0.026*** | 0.026*** | 0.027*** | 0.027*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Coworker entr. within past __ years | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Mean(share) | 0.008 | 0.015 | 0.022 | 0.028 | 0.034 | 0.039 | 0.045 | 0.051 | 0.056 | 0.060 |
| Std dev(share) | 0.054 | 0.071 | 0.081 | 0.089 | 0.095 | 0.100 | 0.105 | 0.108 | 0.111 | 0.114 |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that the extensive margin spillovers are similar regardless of how recent I measure coworkers' entrepreneurship. The table presents regression estimates of model (1) performed on the sample of individuals in 2004 based on the share of coworkers who entrepreneurs within the past 1, ..., 10 years, with controls indicated in the footer (model (1) controls are log establishment employment, own recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects measured at the time of exposure). (Column 5 is the baseline estimate from Table 2.)

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N=46,680,000.

Table OA.21: Entrepreneurs who worked with more entrepreneurial coworkers are more likely to cite role models as leading to their entrepreneurship

| | Dependent Variable: Role Models Were At Least Somewhat Important | |
|---|---|---|
| | (1) | (2) |
| Share of coworkers with entrepreneurship | 0.084** | -0.1577 |
| | (0.038) | (0.141) |
| Share of coworkers with entr. and survived to age 2 | | 0.2603* |
| | | (0.145) |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents survey evidence that entrepreneurial coworkers serve as role models to future entrepreneurs. Individuals who work with proportionally more entrepreneurial coworkers, and then become entrepreneurs, are more likely to say that entrepreneurial role models were important to their decision to become an entrepreneur.

This table presents regression estimates of model performed on the sample of individuals in 2008-2012 who became entrepreneurs in 2013 at firms surveyed by the 2014-2016 ASE (and are matched by demographics to at least one owner in the ASE who reports that they founded the firm).

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N=7,000. Mean of dep var: 0.5507. Mean (std dev) of share with entrepreneurship: 0.06345 (0.1547). Mean (std dev) of share ...and survived to age 2: 0.05561 (0.1490).

Table OA.22: Additional robustness to extensive margin spillovers

| | Dependent Variable: Entrepreneur 2005-2009 | | | | | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Share of coworkers with entrepreneurship | 0.025*** (0.001) | 0.022*** (0.001) | 0.021*** (0.001) | 0.024*** (0.001) | 0.028*** (0.001) | 0.025*** (0.001) | 0.025*** (0.001) |
| Log employment | x | x | x | x | x | x | x |
| Own entrepreneurship | x | x | x | x | x | x | x |
| Demographics | x | x | x | x | x | x | x |
| Log annual earnings | x | x | x | x | x | x | x |
| Age FE | x | x | x | x | x | x | x |
| Industry FE | x | | x | x | x | x | x |
| State FE | x | | x | x | x | x | x |
| Industry-State FE | | x | | | | | |
| Firm age FE | | | x | | | | |
| First year at firm FE | | | | x | | | |
| Within-firm earnings bin FE | | | | | x | | |
| $\mathbb{1}\{$Missing revenue$\}$ | | | | | | x | x |
| Firm log revenue | | | | | | x | |
| Firm log revenue/employment | | | | | | | x |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that the extensive margin spillovers are robust to the inclusion of several additional controls, including industry-by-state, firm age, tenure, and earnings bin fixed effects; past entrepreneurial exposure; and the firm's productivity. The columns present estimates of several adaptations of model (1) with different controls, as indicated in the footer (model (1) controls are log establishment employment, own recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects measured at the time of exposure). In the final two columns, firms with missing revenue information (i.e., does not have LBD revenue data) have revenue or productivity values replaced by the mean; this is controlled for with a missing indicator. Column 1 presents the main baseline results from Table 2 for comparison.

Standard errors are robust and clustered at the establishment level. N=46,680,000. Mean of dep var: 0.031. Mean (std dev) of share of coworkers with entrepreneurship: 0.034 (0.095).

Table OA.23: Evidence against alternative hypotheses: Spawning, exposure to leaders, and workplace culture

| Dependent Variable: | # Entrepreneurs | Co-entrepreneur | Entrepreneur 2005-2009 | | |
|---|---|---|---|---|---|
| Sample | Future entr. | | Main | | Leave in 2004 |
| | (1) | (2) | (3) | (4) | (5) |
| Share of coworkers with entrepreneurship | -0.085*** | -0.003 | | 0.015*** | 0.040*** |
| | (0.005) | (0.004) | | (0.001) | (0.001) |
| Share of coworkers with top 3 earnings at any firm | | | 0.032*** | 0.005*** | |
| | | | (0.000) | (0.000) | |
| Mean(dep var) | 2.046 | 0.241 | 0.034 | 0.034 | 0.041 |
| Mean(share) | 0.064 | 0.064 | 0.034 | 0.034 | 0.036 |
| Std dev(share) | 0.147 | 0.147 | 0.095 | 0.095 | 0.094 |
| Mean(share top 3 at any firm) | | | 0.156 | 0.156 | |
| Std dev(share top 3 at any firm) | | | 0.200 | 0.200 | |
| N | 1,456,000 | 1,456,000 | 46,680,000 | 46,680,000 | 13,030,000 |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence against several alternative mechanisms (coworkers bringing along individuals on their next venture, teaching general leadership skills, or driving individuals to leave the firm) that could explain the extensive margin spillovers. The table presents regression estimates of versions of model (1) performed on the sample of individuals in 2004 (columns 3-4), the subsample of individuals who become entrepreneurs between 2005 and 2009 (columns 1 and 2), and the subsample of individuals whose last year at the firm is 2004 (column 5); with controls indicated in the footer. In columns 1 and 2, the dependent variable is different; in column 1, the dependent variable is the number of entrepreneurs (between 1 and 3, only counting those who appear in the data in 2004) at a future entrepreneur's entrepreneurial firm. In column 2, the dependent variable is an indicator equal to 1 if at least one of the other entrepreneurs (if there are any) at an future entrepreneur's firm was employed at the same establishment in 2004, and 0 otherwise.

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level.

Table OA.24: Exposure to more entrepreneurs does not predict becoming publicly-traded

| Dependent variable: | Publicly-traded within 5 years | | Ever publicly-traded | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Share of coworkers with entrepreneurship | -0.0003 | -0.0002 | -0.0004 | -0.0003 |
| | (0.0002) | (0.0002) | (0.0003) | (0.0003) |
| Entr. industry FEs | | x | | x |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that exposure to entrepreneurial coworkers predicts less successful firms, by the extreme outcome of being publicly-traded. The table presents regressions performed on the sample of individuals who become entrepreneurs between 2005 and 2009. The columns present estimates of (2) for whether a firm becomes publicly-traded (IPO's, i.e., appears in the CSB) within 5 years after entry (columns 1 and 2) or ever (up until 2016, columns 3 and 4), with controls indicated in the footer (model (1) controls are log establishment employment, own recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects measured at the time of exposure).

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N=1,456,000. Mean of dep var: columns 1 and 2: 0.0010; columns 3 and 4: 0.0014. Mean (std dev) of share of coworkers with entrepreneurship: 0.064 (0.147).

Table OA.25: Entrepreneurs who worked with more entrepreneurial coworkers tend to be more self-funded, not family owned, and less innovative

| | Dependent Variable: Entrepreneurial Firm Outcome | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Start-up funding sources | | | Current funding sources | | | | | Family Owned | Patent/ copyright/ trademark |
| | VC | Banks | Family/ friends | Investors | Banks | Grants | Family/ friends | Owner | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Panel A: Without entrepreneurial firm industry fixed effects | | | | | | | | | | |
| Share of cow. | 0.008 | -0.013 | 0.014 | 0.007 | -0.022 | -0.010 | 0.007 | 0.030* | -0.051*** | -0.029*** |
| w/ entr. | (0.005) | (0.015) | (0.012) | (0.012) | (0.018) | (0.011) | 0.016) | (0.016) | (0.017) | (0.013) |
| Year-EY FE | x | x | x | x | x | x | x | x | x | x |
| Panel B: With entrepreneurial firm industry fixed effects | | | | | | | | | | |
| Share of cow. | 0.006 | -0.014 | 0.013 | 0.005 | -0.025 | -0.009 | 0.006 | 0.032** | -0.052*** | -0.025* |
| w/ entr. | (0.005) | (0.015) | (0.012) | (0.012) | (0.018) | (0.011) | (0.016) | (0.016) | (0.017) | (0.013) |
| Year-EY FE | x | x | x | x | x | x | x | x | x | x |
| Entr. ind. FE | x | x | x | x | x | x | x | x | x | x |
| Mean(dep var) | 0.025 | 0.308 | 0.109 | 0.130 | 0.590 | 0.096 | 0.274 | 0.682 | 0.376 | 0.209 |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence against several potential mechanisms behind the entrepreneurial spillovers, including financing, family connections, and technological knowledge transfers. The table presents regressions based on model (1) for different ASE binary outcomes, performed on the sample of individuals who become entrepreneurs of firms that are surveyed in the 2014-2016 ASE, with controls indicated in the footers; "Year-EY FE" indicates year of exposure to coworkers-by-firm entry year fixed effects ("EY"="entry year"). Panel B includes 6-digit industry fixed effects for the entrepreneur's entrepreneurial firm (at entry). Columns 1-3 study the firms' start-up funding, namely whether a firm received funding from venture capitalists (VC), business loans from banks, or business loans from family or friends. Columns 4-8 study the sources of the firms' current funding, including from outside investors (angel investors, VC, or other businesses), banks, government grants, family or friends, and the owner themself. Column 9 studies whether the firm is family owned (i.e., whether two or more members of one family own a majority of the firm); column 10 studies whether the firm owns any patents, copyrights, or trademarks. See Section A.1.3 for precise definitions of the outcomes.

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects). Standard errors are robust and clustered at the establishment level. N=49,000. Mean (std dev) of share: 0.066 (0.151).

Table OA.26: Entrepreneurial exposure predicts higher-paying and lower-inequality entrepreneurship, but this is connected to firm size

| | Dependent Variable: 2005-2009 Entrepreneurial Entry Year Firm Pay | | | | | |
|---|---|---|---|---|---|---|
| | Mean(Log(Earnings)) | | Var(Log(Earning)) | | 90-10(Log(Earning)) | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Share of coworkers w/ entrepreneurship | 0.111*** | -0.003 | -0.179*** | -0.020** | -0.327*** | -0.005 |
| | (0.007) | (0.007) | (0.010) | (0.009) | (0.011) | (0.008) |
| Entry year log(employment) | | -0.297*** | | 0.418*** | | 0.845*** |
| | | (0.001) | | (0.001) | | (0.001) |
| Mean(dep var) | 8.884 | 8.844 | 1.507 | 1.507 | 2.513 | 2.513 |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents evidence that exposure to entrepreneurial coworkers predicts higher paying, less unequal firms, but this patterns is largely driven by the fact that the exposure also predicts smaller firms. The table presents regressions performed on the sample of individuals who become entrepreneurs between 2005 and 2009. The columns present estimates of (2) for different measures of entry year firm pay, with controls indicated in the footer (model (1) controls are log establishment employment, own recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects measured at the time of exposure).

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

Standard errors are robust and clustered at the establishment level. N=1,456,000. Mean (std dev) of the share is 0.064 (0.147); mean (std dev) of entry year log(employment) is 1.928 (1.199).

Table OA.27: Successful and high-earning entrepreneurial coworkers may discourage unsuccessful entrepreneurship

| Dependent Variable: | Entrepreneur 2005-2009 | | | Entrepreneur 2005-2009 and top 10% employment | | | Entrepreneur 2005-2009 and *not* top 10% employment | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Share of coworkers with entrepreneurship | 0.025*** | 0.024*** | 0.025*** | -0.005*** | -0.007*** | -0.005*** | 0.029*** | 0.030*** | 0.030*** |
| | (0.001) | (0.001) | (0.001) | (0.000) | (0.000) | (0.000) | (0.001) | (0.001) | (0.001) |
| Share of coworkers with entr. and top 10% emp | | 0.021*** | | | 0.032*** | | | -0.011*** | |
| | | (0.002) | | | (0.001) | | | (0.002) | |
| Share of coworkers with entr. and earn≥$100k | | | 0.006*** | | | 0.017*** | | | -0.010*** |
| | | | (0.002) | | | (0.001) | | | (0.002) |
| Share earn ≥ $100k | | | x | | | x | | | x |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

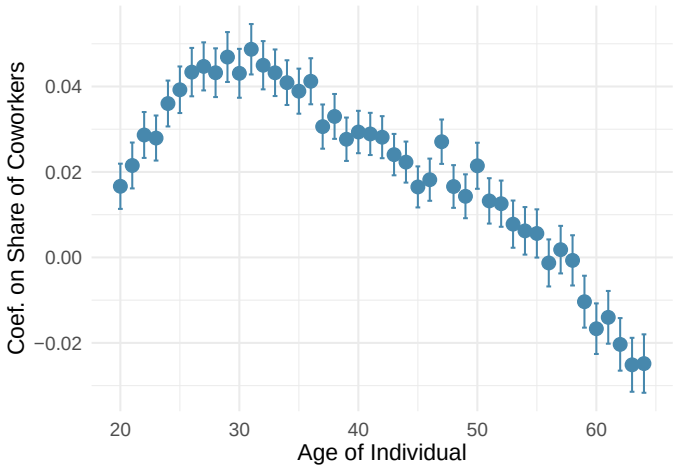
Note: This table presents evidence that particularly successful or high-earning entrepreneurial coworkers may dissuade entrepreneurial ventures that are unlikely to succeed, consistent with the negative spillovers estimated by Lerner and Malmendier (2013), in the context of spillovers across Harvard MBA classmates. The columns present estimates of several adaptations of model (1) with the inclusion of measures of exposure to "like-Harvard MBA" entrepreneurial coworkers and controls noted in the footer and measures of entrepreneurial coworkers' success. "Share of coworkers with entr. and top 10% emp," is the share of coworkers who were recently entrepreneurs and whose entrepreneurial firms was in the top 10% of entry year employment, amongst firms that entered in the same year and industry; "Share of coworkers with entr. and earn≥$100k" is the share of coworkers who were recently entrepreneurs and who earn above $100,000 at the firm in 2004 (in 2010 USD). Column 1 presents the main baseline results from Table 2 for comparison.

All columns include model (1) controls (log employment, recent entrepreneurship, demographics, log earnings, and age, industry, and state fixed effects).

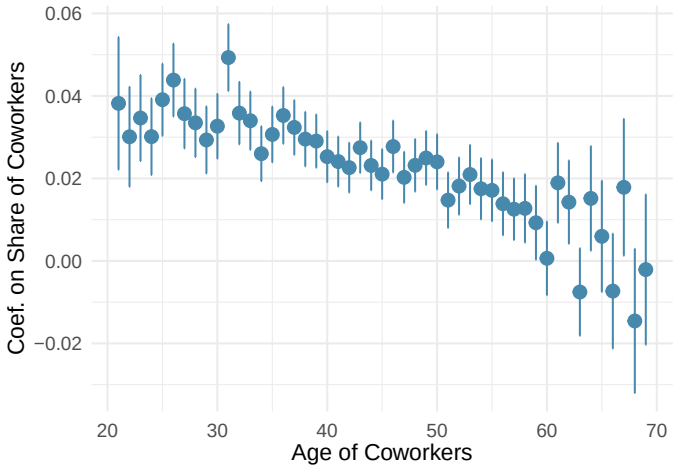
Standard errors are robust and clustered at the establishment level. N = 46,680,000. Mean (std dev) of share of coworkers with entrepreneurship is 0.034 (0.095). Mean of dependent variable: column 1-3: 0.031; 4-6: 0.005; 7-9: 0.026.

Figure OA.1: Spillovers are driven by younger workers

(a) Spillovers are highest from younger workers




(b) Spillovers are highest for relatively young coworkers




Note: This figure presents evidence that extensive margin spillovers are largest for younger individuals (Panel A), who learn from young and middle aged entrepreneurial coworkers (Panel B). This figure presents coefficient and 95% confidence interval estimates of model (1), modified by interacting the share of coworkers who were recently entrepreneurs with the individual's age (Panel A) or by separating out the share of coworkers who were recently entrepreneurs by the age of the coworkers (and controlling for the share of coworkers who are each age, Panel B). Panel A plots the coefficients on the share of an individual's coworkers who were entrepreneurs between 1999 and 2004 by the age of the individual. Panel B plots coefficients on the share of an individual's coworkers who are both a given age and were entrepreneurs between 1999 and 2004; by the construction of the sample, no 20-year-old coworkers are previous entrepreneurs, so the coefficient for age 20 is omitted. Standard errors are robust and clustered at the establishment level.

Figure OA.2: Extensive margin spillovers are marginally higher from more recent entrepreneurship

(a) Coefficients


(b) Coefficients times one standard deviation of share X


Note: This figure presents evidence that extensive margin spillovers are similar regardless of how recent the entrepreneurship of the coworkers was. The figure presents coefficient and 95% confidence interval estimates of model (1), where the share of coworkers with entrepreneurial experience is separated into separate variables by when the (most recent) entrepreneurship occurred (1-10 years ago), performed on the sample of individuals in 2004, including all controls (akin to column 5 of Table 2). Panel A presents the coefficients. Panel B multiplies the coefficients by one standard deviation of the given variable; there is more variation in the share of coworkers who were more recently entrepreneurs, leading to large value for the exposure to more recent entrepreneurs.