

Water Cooler Entrepreneurship:
How Learning from Coworkers Inspires More — But Less Diverse —
Entrepreneurship*

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Abstract

How do workplace social connections shape everyday entrepreneurship? Using comprehensive data on millions of American workers across the economy, I find three key patterns. First, entrepreneurial coworkers inspire and teach entrepreneurship: individuals are more likely to become entrepreneurs after working with coworkers who previously led young businesses. Second, these effects predominantly occur within demographic groups, perpetuating lower entrepreneurship rates for women and Black Americans. Third, these workplace spillovers can increase productivity: individuals exposed to relatively successful coworkers subsequently run successful companies too.

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Workplaces are hubs for many social interactions, especially across individuals with differing backgrounds and experiences. For example, [Chetty et al. \(2022\)](#) find that low socioeconomic status (SES) individuals have higher exposure to high SES peers in the workplace than in their high schools, recreational and religious groups, and neighborhoods. In these settings, individuals who “gather around the water cooler” learn and take inspiration from their coworkers across a variety of domains, from how to be a productive worker to whether to take up parental leave and insurance.¹

In this paper, I characterize how social connections in the workplace shape the landscape of everyday entrepreneurship. I do this in three steps that cover the five W’s — “who,” “what,” “when,” “where,” and “why” (and “how”) — of entrepreneurial learning from coworkers. First, I show that individuals learn entrepreneurship from their coworkers (the “what”): individuals who work alongside former entrepreneurs are more likely to lead firms themselves subsequently, such that entrepreneurial coworkers generate “spillovers” in the form of more new firms. Second, I find that, while this “water cooler” entrepreneurship is a common phenomenon across the economy, the spillovers occur predominantly within demographic groups, if at all (the “who,” “when,” and “where”). Women only learn entrepreneurship from their — rare — female coworkers with entrepreneurial experience, and Black Americans experience almost no learning. This means that, despite workplaces bringing together workers from different backgrounds, entrepreneurial learning across coworkers actually *exacerbates* diversity issues in entrepreneurship. Third, these spillovers convey lessons that subsequently generate firms that mimic the coworkers’ previous firms (the “why” and “how”). Because most entrepreneurs are not superstars, entrepreneurial coworkers on average inspire mediocre new firms; but, individuals who are “lucky enough” to work with relatively successful entrepreneurial coworkers appear to learn skills that translate into their own success as entrepreneurs.

I take these steps in turn by using data on over forty million Americans from the U.S. Census Bureau, where I leverage the richness of the data to characterize who is affected and the lessons learned. I combine longitudinal information on individuals and their coworkers in the Longitudinal Employer-Household Dynamics (LEHD) data with Census Bureau data on firms’ outcomes. The scope of this data, which is large and spans many demographic groups, states, and industries, allows me to explore the heterogeneity of these spillovers and to construct estimates that are relevant in the national context; importantly, this paper studies “everyday entrepreneurship” — e.g., individuals starting new restaurants and shops, rather than venture capital-backed tech startups — which represents the modal entrepreneurship in the economy. Furthermore, studying the charac-

¹See [Herkenhoff, Phillips, and Lise \(2018\)](#), [Jarosch, Oberfield, and Rossi-Hansberg \(2021\)](#) for human capital/productivity, [Dahl, Løken, and Mogstad \(2014\)](#) and [Welteke and Wrohlich \(2019\)](#) for parental leave, and [Handel et al. \(2020\)](#) for insurance.

teristics of the firms that arise through these spillovers allows me both to evaluate the productivity implications of these spillovers and to characterize the lessons learned through these spillovers. While there are several ways of measuring entrepreneurship, in my main analyses I follow the recent literature and call an individual an entrepreneur if they are one of the top three earners at a new firm.² This measure of entrepreneurship captures individuals who likely hold influential positions at young firms.

The first step of the paper addresses the “what” question of entrepreneurial learning across coworkers: namely, what is the role of coworkers with previous entrepreneurship in generating new firms? I estimate entrepreneurial spillovers across establishment coworkers by leveraging variation in individuals’ exposure to coworkers with prior (within the past five years) entrepreneurial experience. As Figure 1 demonstrates, working with a larger share of entrepreneurial coworkers predicts entrepreneurship. I find that individuals who work with one standard deviation (about 10 percentage points) higher share of coworkers who were entrepreneurs in the past five years are 8% more likely to become entrepreneurs themselves in the next five years, relative to the average likelihood: exposure to entrepreneurial coworkers appears to nudge individuals towards entrepreneurship. This finding is robust to the key identification concern that individuals sort across workplaces, such that the set of coworkers a worker faces is not random; I provide several tests, including conducting panel regressions with establishment or worker fixed effects, that suggest that spillovers still occur conditional on sorting. I also present survey evidence consistent with spillovers: individuals who become entrepreneurs after working with entrepreneurial coworkers are more likely to report having entrepreneurial role models who inspired their entrepreneurship, meaning that they self-report the spillovers.

The second step of the paper addresses the “who,” “when,” and “where” questions: which workers learn and gain inspiration from entrepreneurial coworkers, and in which circumstances does this happen? While I find evidence that individuals do on average learn entrepreneurship from their coworkers and these spillovers occur broadly across sectors, these spillovers are concentrated amongst the traditionally represented groups in entrepreneurship — White and Asian men — such that spillovers may actually perpetuate low entrepreneurship rates amongst minorities.³ This arises for two reasons. First, exposure to entrepreneurial coworkers is not equal across demographic groups, with Blacks working with significantly lower shares of former entrepreneurs compared to Whites; Blacks are not working in the “right” firms in order to take advantage of learn-

²See Agarwal et al. (2016), Kerr and Kerr (2017), and Azoulay et al. (2018). I test the robustness of this definition in Appendix A.I.

³In the mid-2000s, only 41% of new business leaders were women despite women making up 47% of the workforce; meanwhile, only 5% and 9% of new business leaders were Black and Hispanic, respectively, despite each group representing 10% of the workforce (Table 1). These shares are significantly smaller in the hyper-selected setting of venture capital-backed startups, in which women represent less than 9% of entrepreneurs and Blacks and Hispanics less than 0.5% and 4% of entrepreneurs, respectively (Calder-Wang and Gompers (2017)).

ing opportunities. Second, conditional on exposure to entrepreneurial coworkers, spillovers occur mostly within demographic groups, if at all. Women appear to learn entrepreneurship only from their (uncommon) female entrepreneurial coworkers, and Blacks seemingly learn entrepreneurship from none of their coworkers, regardless of race. These two forces – unequal exposure and lower rates of spillovers conditional on exposure – mean that minority entrepreneurship is unlikely to blossom through workplace connections.⁴

The third and final step of the paper addresses the “why” and “how” questions: when entrepreneurial learning happens, why and how does it happen? The goal here is to understand whether former entrepreneurs are simply inspiring entrepreneurs or also teaching them skills that will generate more productive new businesses. I find that individuals who become entrepreneurs after working with relatively more entrepreneurial coworkers tend to start firms that are smaller in both employment and sales and are less likely to survive, meaning that the spillovers tend to generate mediocre firms. This is consistent with a net pattern of individuals on average simply being inspired or learning the institutional knowledge needed to start a firm, as this leads to less productive individuals choosing to become entrepreneurs. However, if the individuals’ entrepreneurial coworkers ran larger or longer-surviving firms, the individuals are more likely to start firms that are larger and more likely to survive. These results suggest scope for *some* true productivity gains via entrepreneurial skill spillovers, if the spillovers are from particularly successful entrepreneurs. This scope is limited by the frank reality that most former entrepreneurs an individual gets to meet are not superstars.

This paper contributes to several literatures. Most directly, the paper relates to papers on learning entrepreneurship from coworkers and communities, which generally document a potential presence of entrepreneurial spillovers but have virtually nothing to say on *who* is affected by the spillovers and no or mixed evidence on *what* is transmitted across spillovers. For example, **Nanda and Sørensen (2010)** briefly study entrepreneurial spillovers across a small sample of coworkers in Denmark, finding evidence of positive extensive margin spillovers in support of learning.⁵ Other work considers entrepreneurial spillovers in other contexts. **Guiso, Pistaferri, and Schivardi (2021)** and **Giannetti and Simonov (2009)**, for instance, find evidence of people learning entrepreneurship from their broader (geographic) community in Italy and Sweden, respectively. Meanwhile,

⁴These patterns are consistent with past literature that emphasizes the role of within-group mentorship for women as well as lower rates of discussing business ideas with peers for Blacks. For example, **Rocha and Van Praag (2020)** document that women are more likely to become entrepreneurs after working at female-founded startups in Denmark. **Bennett and Robinson (2023)** argue that the lower rate of idea socialization by Black would-be entrepreneurs is a crucial contributor to the Black-White entrepreneurship gap.

⁵**Nanda and Sørensen (2010)** find that a one standard deviation higher exposure to entrepreneurial coworkers predicts a 4% higher likelihood of becoming an entrepreneur subsequently. Surveying 292 representative Dutch entrepreneurs, **Bosma et al. (2012)** present evidence of former colleagues and employers serving as role models for entrepreneurship. **Stuart and Ding (2006)** find evidence of academic life scientists’ entrepreneurship being positively correlated with their colleagues’ experience with commercial science.

Lerner and Malmendier (2013) leverage randomly assigned peer groups among Harvard MBAs and find evidence of nuanced entrepreneurial spillovers; having more previous entrepreneurs as classmates reduced students' likelihood of later becoming an entrepreneur, driven by a decrease in future unsuccessful entrepreneurship.^{6,7}

Using large, broad, and high-quality data that allow me to study a wide span of the American workforce, I find evidence consistent with the basic story these papers tell: nascent entrepreneurs' transition into entrepreneurship can be affected by their exposure to entrepreneurs. I provide new evidence characterizing these spillovers, both in terms of *who* is affected and *how* the spillovers affect productivity. My ability to study the nature of these spillovers stems from the size and scope of my data. For instance, Nanda and Sørensen (2010) do not characterize the spillovers beyond their existence, citing limitations in their data, including a lack of firm performance information as well as limited ability to control for and analyze time-varying individual- and firm-level attributes. Similarly, the external validity of studies of very narrow settings such as Harvard MBA classrooms (Lerner and Malmendier (2013)) is unclear; meanwhile, by studying the average American workplace, I produce results that are relevant economy-wide.⁸

More broadly, this paper contributes to the literature on entrepreneurial occupation choice, demonstrating how entrepreneurship can arise from learning from entrepreneurs.⁹ Furthermore, this paper highlights another dimension in which social networks formed in the workplace can have profound effects on individuals' lives.¹⁰ Understanding the role of workplaces in generating

⁶Shue (2013) and Hacamo and Kleiner (2021) also study entrepreneurial spillovers across MBA classmates, finding evidence of positive spillovers in terms of firm policies and confidence, respectively. For younger students, Falck, Heblich, and Luedemann (2012) find positive correlations between a teenager's entrepreneurial intentions and their classmates'.

⁷There is also evidence of entrepreneurial spillovers within family members (e.g., Hvide and Oyer (2018), Akcigit et al. (2021), Lindquist, Sol, and Van Praag (2015), and Djankov et al. (2006)) as well as from employer to worker (e.g., Gompers, Lerner, and Scharfstein (2005), Bosma et al. (2012), and Babina and Howell (2020)). Additionally, there is mixed evidence of peer effects in the context of formal entrepreneurial training (e.g., Chatterji et al. (2019), Hasan and Koning (2019), Field et al. (2016), Karlan and Valdivia (2011)). More broadly, there is evidence of peer and network effects across firms, executives, and individuals in terms of executive compensation and financial decisions; see, for example, Davis and Greve (1997), Hong, Kubik, and Stein (2005), Cohen, Frazzini, and Malloy (2008), Shue (2013), Bursztyn et al. (2014), Leary and Roberts (2014), Fracassi (2017), Bernstein et al. (2019), and Kleiner, Stoffman, and Yonker (2021). Similarly, there is evidence of location-based spillovers of innovation, etc.; see Roche (2020) as a recent example.

⁸In Appendix OA.V, I provide evidence to reconcile my findings with Lerner and Malmendier (2013) by narrowing in on "like-Harvard MBA" entrepreneurial coworkers.

⁹See Segal, Borgia, and Schoenfeld (2005) for a broad description of the various motivations for entrepreneurship. There is a related literature on the innovative and corporate motivations and decisions of firm managers and executives. See, for example, Bertrand and Schoar (2003), Graham et al. (2009), Campbell et al. (2011), Malmendier, Tate, and Yan (2011), Hirshleifer, Low, and Teoh (2012), Kaplan, Klebanov, and Sorensen (2012), Ben-David, Graham, and Harvey (2013), Graham, Harvey, and Puri (2013), Faleye, Kovacs, and Venkateswaran (2014), and Hall et al. (2014).

¹⁰There is a broader literature on individuals "learning" from coworkers in other domains, such as productivity-enhancing learning such as human capital (Herkenhoff, Phillips, and Lise (2018), Jarosch, Oberfield, and Rossi-Hansberg (2021)) and other behavioral imitation such as take-up of parental leave (Dahl, Løken, and Mogstad (2014), Welteke and Wrohlich (2019)) and insurance (Handel et al. (2020)).

opportunities for workers of different backgrounds is of growing importance, as workplaces have become more segregated along demographics over the past few decades (see, e.g., [Sorkin and Wallskog \(2023\)](#)). Finally, this paper contributes to the broader literature on growth driven by new firms, their employees, and declining dynamism, demonstrating an understudied source of new firms.¹¹

The remainder of this paper is organized as follows. Section **I** describes the U.S. Census Bureau data and samples used. The following three sections (Sections **II**, **III**, **IV**) take the three steps of the paper, covering the “what,” “who”/“when,”/“where” and “why”/“how” questions of learning from entrepreneurial coworkers, respectively. Section **V** concludes. A number of additional results are contained in an appendix available online.

I Data

I use several datasets from the U.S. Census Bureau to measure the entrepreneurship and entrepreneurial outcomes for individuals and their coworkers.¹² See Appendix **A.I** for details on these datasets and how samples and variables are constructed. Here, I present broad summary statistics for the main sample.

1.A Coworkers and firm and worker characteristics

I measure earnings, demographics, and firm information for individuals and their coworkers using the Longitudinal Employer Household Dynamics (LEHD), which is the matched employer-employee data that covers the near-universe of formally employed workers in the United States. The LEHD is constructed from firm-side state unemployment insurance (UI) records and contains information on employment, earnings, and demographics. The data contains longitudinal employer and individual identifiers that allow me to link individuals and their coworkers and follow workers over time as they change jobs. I use LEHD data from 1993 to 2013 for a balanced sample of 18 states; for my main sample, I focus on individuals working in the middle of this time window (2004), for whom I can measure previous and future outcomes.¹³ My main notion of an individual’s employer is the establishment at which they earn the most in a given year.¹⁴ An individual’s

¹¹This literature highlights that young firms are important for both employment growth ([Haltiwanger, Jarmin, and Miranda \(2013\)](#)) and innovation ([Klenow and Li \(2021\)](#)). Thus, promoting entry of young firms is policy-relevant, especially given a steady decline in firm and labor dynamism over the past few decades ([Decker et al. \(2014\)](#)).

¹²Data is available to researchers on approved projects through the Federal Statistical Research Data Center (FS-RDC) network ([Bureau \(2023\)](#)).

¹³This results in a balanced panel of the following 18 states: AK, AZ, CA, CO, FL, ID, IL, IN, KS, LA, MD, MO, MT, NC, OR, WA, WI, WY (other states only provide data starting in later years). In the 2004 Current Population Survey Annual Social and Economic Supplement (CPS ASEC), these 18 states account for 44% of age 20-64 national employment. I source CPS data from IPUMS ([Flood et al. \(2020\)](#)).

¹⁴For this paper, the “establishment” is the least aggregate firm unit available in the LEHD, i.e., a state-level unemployment insurance account (called a State Employer Identification Number, or SEIN). For many employers, the establishment has a single location; for others, the establishment is a pooled collection of physical locations within a given state, generally within a single sector. Approximately half of individuals work at single-location establishments

coworkers are all other individuals with the same employer in the same year. From the LEHD, I measure individuals' firm-level earnings¹⁵ and demographics, including age, sex, race/ethnicity, education, and country of birth; I also measure establishment and firm variables, including industry and sector (based on 6-digit NAICS codes) and employment (counting the individual and their coworkers).

I.B Entrepreneurship and entrepreneurial outcomes

I measure entrepreneurship for individuals and their coworkers using the LEHD, which I supplement with firm entry information from the Longitudinal Business Database (LBD), which tracks all U.S. firms with paid employees over time. While there are several ways of measuring entrepreneurship, I follow the recent literature¹⁶ and call an individual an entrepreneur if they are a top three earner at a new firm.¹⁷ This definition will not always capture individuals who found a firm; sometimes, founders take little or no salary in the early years as their firms grow. In these cases, this definition will instead capture likely leaders or managers of these firms. For this paper, I take this measure of entrepreneurship as indicating individuals who hold influential positions at young firms and likely gain “entrepreneurial” experience in doing so.¹⁸ We can think of these individuals as firm leaders, managers, and sometimes founders; I parsimoniously call them entrepreneurs in this paper.

For entrepreneurs, I measure a variety of outcomes for their new firms using the LEHD and several other Census data products. These outcomes include size and survival from the LEHD, revenue and revenue productivity (log revenue per worker) from the LBD, and a variety of entrepreneurial outcomes from the Annual Survey of Entrepreneurs (ASE).¹⁹

in 2004. Establishments belong to firms (given by the Census FIR MID). When individuals work at multiple firms or establishments in a year, I restrict to their highest-paying employer within that year. After making this restriction, I restrict my sample to individuals with coworkers, i.e., those at establishments with at least two employees. After this restriction, I make one final restriction: I focus on individuals aged 20-64, for whom I can measure entrepreneurship in the next five years up until age 69.

¹⁵These earnings include salaries and wages as well as bonuses, stock options, and other cash pay and are deflated to 2010 dollars.

¹⁶I follow Agarwal et al. (2016), Kerr and Kerr (2017), and Azoulay et al. (2018) in doing this; Azoulay et al. (2018) audits this initial team definition using W-2 records to compare founders to initial team members. They find that “90% of the owner-workers are in fact among the top three earners in the firm during the first year,” though this coverage is noisy. There are firm owners who take no labor earnings; these individuals are naturally missed by this definition.

¹⁷I identify the three highest annual earners at a firm in the first year in which it employs workers, as measured in the LEHD.

¹⁸Appendix A.I provides tests of this definition.

¹⁹As discussed in Appendix A.I, I additionally use management information from the Management and Organizational Practices Survey (MOPS), legal form from the Business Register (BR), and whether a firm is privately-held or publicly-traded from the Compustat-SSEL Bridge (CSB).

I.C Summary statistics

g In Table 1 I present entrepreneurial, demographic, job, and establishment characteristics of all individuals working in 2004 and of those who later become entrepreneurs between 2005 and 2009. Relative to the general population, future entrepreneurs tend to be young, male, educated, White and Asian, born outside the U.S., higher earning, and working at smaller, younger firms. They also tend to work with more entrepreneurial coworkers, which I explore more systematically in the remainder of the paper.

Despite the fact that future entrepreneurs are different from workers in general, they work and become entrepreneurs across the economy. As Figure 2 shows, future entrepreneurs work in all industries in 2004 and start firms in all industries, though they disproportionately work and start firms in construction, professional/scientific/technical services (e.g., R&D and law and accounting services), and accommodation and food services, and less often appear in manufacturing and health, compared to the general workforce. Nearly half of future entrepreneurs start firms in the same sector as their 2004 establishment.

II “What”: What is the role of coworkers with previous entrepreneurship in generating new firms?

In this first part of the paper, I address the “what” question of learning from entrepreneurial coworkers, namely what is the role of these coworkers in promoting entrepreneurship? There are a variety of reasons why entrepreneurial coworkers could encourage — or even discourage — entrepreneurship.²⁰ For example, former entrepreneurs may inspire entrepreneurship by sharing happy memories, describing the logistics of starting a firm, or making suggestions on nascent entrepreneurs’ business ideas; alternatively, former entrepreneurs may recount the stresses of entrepreneurship and consequently discourage would-be entrepreneurs. In this section, I explore the simple *existence* and direction of net spillovers; I turn to mechanisms in Section IV.

I estimate entrepreneurial learning across coworkers by leveraging variation in individuals’ exposure to coworkers with prior entrepreneurial experience, conditional on rich controls. I find evidence of positive extensive margin spillovers: individuals who work with one standard deviation (10 percentage points) higher share of entrepreneurial coworkers are 2.5 percentage points more likely to become entrepreneurs themselves within the next five years, an 8% increase relative to the average likelihood. This finding is robust to the key identification concern that individuals sort across workplaces, such that coworkers are not randomly assigned.

II.A Empirical strategy: Leverage variation in exposure to entrepreneurial coworkers

In order to study the extensive margin, I estimate a model of entrepreneurship with rich controls that leverages cross-individual variation in exposure to entrepreneurial coworkers. Here I begin

²⁰See Appendix OA.I for a detailed conceptual framework outlining potential mechanisms.

with my main analysis that compares the entrepreneurship of individuals cross-sectionally; below, I argue that these results are robust to key identification concerns.

I find that if an individual interacts proportionally more with former entrepreneurs, then they are more likely to become an entrepreneur subsequently. To make this causal argument, I want to compare individuals who are very similar, both in terms of their own demographics and entrepreneurship experience and their current firms, but who (perhaps randomly) have different exposure to entrepreneurial experience.

I estimate the following linear probability model:²¹

$$(1) \quad \text{Future entrepreneurship}_{i,n,s} = \alpha + \beta \text{Share of coworkers with entrepreneurship}_i + \mathbf{X}_{i,n,s} \boldsymbol{\delta} + \xi_{i,n,s},$$

where $\text{Future entrepreneurship}_{i,n,s}$ is an indicator equal to 1 if individual i , whose 2004 primary establishment belongs to industry n (given by a 6-digit NAICS code) and is located in state s , becomes an entrepreneur within the next 5 years (i.e., from 2005 through 2009), and 0 otherwise.²² The key coefficient of interest is β on the share of individual i 's 2004 primary establishment coworkers who were entrepreneurs within the past 5 years; the share is a proportion and lies between 0 and 1.²³ This coefficient measures the relationship between having a larger share of coworkers in 2004 with recent entrepreneurship experience and the likelihood of becoming an entrepreneur in the near future.²⁴

The model also contains a vector of controls $\mathbf{X}_{i,n,s}$ that are chosen to bolster a causal interpretation of β measuring the causal effect of exposure to entrepreneurial coworkers on an individual's future entrepreneurship. Intuitively, by including controls, I make a "selection on observables" argument: conditional on these controls, exposure to entrepreneurial coworkers is exogenous; below, I test this argument by quantifying several identification concerns. Here, I include controls that may correlate with both the outcome and exposure variables, such that excluding these controls would generate endogeneity (i.e., omitted variable bias).

²¹In unreported results, I confirm that my extensive margin results are similar if estimated as a logistic model, rather than a linear probability model.

²²This indicator for being a future entrepreneur is zero if the individual either appears in my sample of states in 2005-2009 as a worker only (i.e., as a worker, but not as an entrepreneur) or does not appear in my sample of states (e.g., because they are unemployed, not in the labor force, or working in a state outside of my sample.)

²³Specifically, this variable is calculated by counting the number of individual i 's coworkers who were entrepreneurs (started a firm) between 1999 and 2003, and then dividing this count by the total number of coworkers. I exclude coworkers who are currently entrepreneurs in 2004.

²⁴In untabulated results, I find that spillovers also appear in an alternative specification where I consider exposure to *any* entrepreneurial coworkers, particularly for smaller establishments where an individual may be more likely to run into a single particular employee. Individuals at establishments with fewer than 25 employees are 17.7% more likely to become entrepreneurs if they work with at least one entrepreneurial coworker, relative to the mean, while those at establishments with more than 100 employees are 10.9% more likely to become entrepreneurs if they have any entrepreneurial coworkers.

I control for several variables that, as shown in Table 1, are correlated with an individual’s future entrepreneurship. Namely, I control for individual i ’s primary establishment’s log employment²⁵ because future entrepreneurs tend to work at smaller establishments. Similarly, I control for individual i ’s own entrepreneurial experience by including indicators for whether the individual was previously an entrepreneur between 1999 and 2003 and for whether the individual is currently an entrepreneur in 2004, since entrepreneurship is highly serially correlated within individual. I control for individual i ’s 2004 log annual earnings at their primary firm, since future entrepreneurs tend to have higher earnings, perhaps because higher-paid individuals are more productive or have more access to start-up capital. Furthermore, I control for a vector of demographic controls, including age fixed effects and indicators for sex, race, four-bin education, and birth in the United States,²⁶ because, compared to the general workforce, future entrepreneurs tend to be younger, male, more educated, White or Asian, or born outside the U.S. Many of these variables may correlate with individual i ’s exposure to entrepreneurial coworkers, making it important to control for them; for example, workers of particular demographics (and consequently similar entrepreneurial proclivities) may cluster at certain firms.

Additionally, I control for detailed industry and state fixed effects based on the industry and location of their 2004 primary establishment. Controlling for industry fixed effects is important because entrepreneurship rates vary dramatically by industry; for example, around 2004, many new firms entered the construction sector, perhaps due to booming housing demand (Figure 2). Controlling for state fixed effects is similarly important because there may be location-based policies that promote both future entrepreneurship and past entrepreneurship of coworkers.

The model also includes an idiosyncratic draw, $\xi_{i,n,s}$. Note that the share of individual i ’s coworkers who were previously entrepreneurs is correlated with that share for their coworkers themselves; treatment is effectively defined at the establishment level. For this reason, I estimate this model with standard errors clustered at the establishment level.

Before I present the estimates of this model, note that both the sign and magnitude of β are not known ex-ante, such that both the sign and magnitude are empirical questions. That is, β measures the linear prediction of having more entrepreneurial coworkers on future entrepreneurship, holding fixed the set of controls as specified. If we interpret model (1) as estimating a causal entrepreneurial spillover, β could be positive if individuals are inspired or taught by entrepreneurial coworkers. Alternatively, β could be negative if these entrepreneurial coworkers discourage entrepreneurship.

²⁵For this measure of employment, I only count individuals for whom the establishment is their primary establishment. This is the group of workers who are considered when identifying coworkers. In untabulated results, I control for establishment employment more flexibly (by including either employment bin or employment level fixed effects) and find qualitatively similar results.

²⁶As noted above, non-imputed demographics are not available for all individuals. In regressions below, I assign the mean demographic values to those with missing demographics and then include as controls indicators for missing the various demographic values.

These spillovers could be large or small in magnitude.

II.B Main results: Entrepreneurial coworkers inspire new entrepreneurship

Columns 1-5 of Table 2 present the point estimates from model (1) as controls are gradually added, showing that individuals who work with proportionally entrepreneurial coworkers are more likely to become entrepreneurs in the future, regardless of the inclusion of controls. As more controls are added, this relationship decreases marginally but remains relatively stable.

In the full specification (column 5), the coefficient on the share of coworkers with entrepreneurial experience is 0.025: this predicts that an individual whose entire set of coworkers have entrepreneurial experience is 2.5 percentage points more likely to become an entrepreneur themselves, compared to an individual who works with no entrepreneurial coworkers. Only 3.1% of the sample become entrepreneurs, such that 2.5 percentage points is very large relative to 3.1%, suggesting an 80% increase relative to the mean.

However, this interpretation may be misleading, since very few individuals work with entirely former entrepreneurs. Instead, consider an increase in one standard deviation: the estimated model predicts that individuals who work with a one standard deviation (9.5 percentage points) higher share of entrepreneurial coworkers are 0.236 percentage points more likely to become entrepreneurs in the next five years. This gap is still large: a 0.236 percentage point increase in the predicted future entrepreneurship maps into a 7.6% increase, relative to the mean;²⁷ this increase is comparable to the prior findings in the literature.²⁸

To provide a simple evaluation of the size of these spillovers, I conduct a back-of-the-envelope calculation to approximate how much the spillovers boosted aggregate entrepreneurship in 2004. I predict the number of “additional” future entrepreneurs that start firms in the presence of spillovers by multiplying the coefficient on the share with the mean share of coworkers with entrepreneurship experience (0.03356) and the number of individuals (46.68 million). This calculation yields a predicted additional 39,000 future entrepreneurs, which amounts to a 2.75% increase.²⁹ This calculation, while inherently simple and based on partial equilibrium numbers, demonstrates that these spillovers can generate many new firms. The fact that the spillovers are not the main source

²⁷This is calculated by the following: one standard deviation of share of coworkers with entrepreneurial experience (0.095) times the coefficient on the share of coworkers with entrepreneurial coworkers (0.025) divided by the share of individuals who become entrepreneurs (0.03120).

²⁸In Denmark, Nanda and Sørensen (2010) find that a one standard deviation in an individual’s coworkers’ entrepreneurship predicts a 4% increase in their future entrepreneurship, relative to the mean. In Italy, Guiso, Pistaferri, and Schivardi (2021) find that a one standard deviation in an individual’s local firm density at age 18 predicts an 8% increase in their entrepreneurship, relative to the mean. In Sweden, Giannetti and Simonov (2009) find that a one standard deviation increase in an individual’s local entrepreneurship predicts a 5.7% increase in their entrepreneurship, relative to the mean.

²⁹I reach a 2.75% increase by dividing the predicted number of entrepreneurs (number of observations * mean share * coefficient, i.e., 46,680,000 * 0.03356 * 0.02494 = 39,000) by the difference between the actual number (number of observations * future entrepreneurship rate, i.e., 46,680,000 * 0.03120 = 1,456,416) and the predicted number.

of new firms is not surprising — many factors enter into an individual’s decision to become an entrepreneur, and the spillovers measured here represent how that decision may be spurred at a snapshot in time. Nonetheless, these spillovers demonstrate that there exists a large number of marginal, “nudgeable” individuals who may opt to become entrepreneurs.

II.C Robustness: Quantifying potential identification concerns

While I argue above that model (1) controls for important possible sources of endogeneity, there remains the possibility that other unobserved or misspecified characteristics generate endogeneity problems. As summarized in [Sacerdote \(2014\)](#), it is difficult to estimate causal peer effects from observational data for three categories of reasons: selection into peer groups, common shocks, and the reflection problem. I discuss each of these in turn and provide evidence quantifying these concerns.

II.C.1 Selection into peer groups

In this paper, selection into peer groups is the greatest concern: individuals do not randomly sort into workplaces, such that exposure to entrepreneurial coworkers may reflect some confounding force beyond those accounted for in the controls rather than causal peer effects. This could happen for two broad reasons. First, entrepreneurship-prone individuals may cluster at certain firms or establishments with hopes of learning entrepreneurial skills or using these firms or establishments as launchpads for entrepreneurial careers, such that spillovers reflect employer effects rather than coworker effects. Second, entrepreneurship-prone individuals may cluster at certain firms or establishments for a reason unrelated to entrepreneurship. For example, if entrepreneurial-type individuals tend to have higher human capital, they may cluster at certain workplaces because of their similar human capital. To address these concerns beyond controlling for individuals’ own recent entrepreneurship experience, I perform several robustness exercises. First, I measure spillovers controlling for selection into workplaces, leveraging variation in exposure *within* an establishment over time. Second, I measure how spillovers affect the *timing* of entrepreneurship within an individual, controlling for an individual’s fixed likelihood of entrepreneurship.

Selection into workplaces I quantify the role of selection into workplaces in the patterns measured above by leveraging variation in exposure to entrepreneurial coworkers *within* an establishment. Holding fixed the establishment — as well as the *selection* into the establishment — I show that spillovers persist: changes in the presence of entrepreneurial coworkers within an establishment predict future entrepreneurship.

I estimate spillovers across coworkers in a panel version of my data, holding fixed the establishment. To do this, I extend my data into a panel by adding individuals in 2003 (in addition to those in 2004) and re-estimate model (1) with the inclusion of year and establishment fixed effects; because variation in establishments over time may confound firm life cycle effects, I additionally control

for firm age fixed effects. Columns 6 and 7 of Table 2 present the results. Column 6 excludes establishment fixed effects and presents estimates comparable to those in column 5 of Table 2; in this panel sample, individuals working with a one standard deviation higher share of entrepreneurial coworkers are 7.4% more likely to become entrepreneurs within the next 5 years, relative to the mean. Column 7 leverages variation within establishments by adding establishment fixed effects, consequently accounting for (at least in part) selection into establishments that is fixed within the narrow time window. As the results show, there *is* a role for selection: the inclusion of the establishment fixed effects reduces the effect of spillovers by a little over a third. Yet, the spillovers I measure are not fully accounted for by selection into workplaces: controlling for this selection, a one standard deviation increase in entrepreneurial coworkers predicts a 4.6% higher likelihood of becoming an entrepreneur, relative to the mean. We can use this more conservative estimate if we want to “remove” the role of this selection.³⁰

It is worth noting that selection into establishments may not be fixed over time. First, as already mentioned, variation in establishments over time necessarily involves considering different parts of an employer’s life cycle; by focusing on a short panel and including firm age fixed effects, I conclude that the spillovers are not driven by working at a young firm, for instance.³¹ Second, an employer’s propensity to hire entrepreneurial workers may depend on its situation; for instance, perhaps firms experiencing dramatic growth are more likely to become hubs for entrepreneurial individuals. If this is the case, employer fixed effects may miss this time-varying role for firms. I show in Table OA.1 that the results persist controlling for establishment employment growth at various horizons, and there is no consistent relationship between the growth and spillovers. Put differently, these spillovers appear to happen at both quickly and slowly growing employers and so are not driven by firm growth. Similarly, the spillovers do not appear to be driven by 2004 employer success — it is not the case that spillovers are clearly accounted for by individuals’ employers’ productivity or revenue, as shown in Table OA.2.³²

Appendix OA.II provides additional tests, including showing that individuals disproportionately appear to learn from their true coworkers — other workers at their establishment — as opposed to other workers at the same firm but at other establishments (Table OA.3). I additionally show that these spillovers cannot be fully accounted for by selection into having specific coworkers; the results are not driven by individuals seeking out entrepreneurial coworkers.

³⁰One possible concern with this analysis is that establishments that newly hire more former entrepreneurs may be shifting their hiring in general, e.g., because they are starting a new project. In untabulated results, I restrict this analysis to individuals who joined their firm in 2002 or earlier; these individuals were not hired during the same time new entrepreneurial coworkers may have been hired. (I allow these individuals’ entrepreneurial coworkers to have joined after 2002.) I find similar results for this subsample, consistent with these within-establishment patterns not simply reflecting general hiring changes.

³¹In untabulated results, I find similar coefficients without the inclusion of firm age fixed effects.

³²Table OA.2 also shows that spillovers may be stronger at more successful employers.

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.4, 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.³³

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.4 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.³⁴ Thus, we see patterns of spillovers even within-individual, accounting for fixed components of selection at the individual level.

II.C.2 Common shocks

Common shocks outside of the firm could drive both an individual’s future entrepreneurship and their coworkers’ past entrepreneurship: industry business cycles or local pro-business government policies could generate fluctuations in the attractiveness of entrepreneurship. However, as discussed in further detail in Appendix OA.II, there is little space nor evidence for these common shocks driving the results. Results are robust to the inclusion of establishment ZIP code-by-industry fixed effects and are not driven by time-varying local business cycle factors (Table OA.5).

II.C.3 The reflection problem

The canonical reflection problem, first described in Manski (1993), captures bias created when trying to estimate the relationship between an individual and their peers’ outcomes when these outcomes are measured at the same time. The reflection problem is not relevant for this paper because I measure coworkers’ entrepreneurship in the past and individuals’ in the future, and it is unlikely that an individual’s future entrepreneurship affects their coworkers’ past entrepreneurship,

³³This person panel analysis is inspired by Table 4 of Nanda and Sørensen (2010).

³⁴The 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 more than one year in the future).

controlling for their past entrepreneurship.³⁵

II.D Survey evidence of spillovers

While the results so far suggest that entrepreneurial coworkers inspire new entrepreneurship, I next 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,³⁶ 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.³⁷

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 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 IV), 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 2013³⁸ and whose entrepreneurial firm is surveyed in at least one of the

³⁵I follow [Lerner and Malmendier \(2013\)](#) in making this argument.

³⁶These 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.”

³⁷According 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.

³⁸Ideally, I would study firms in the ASE that start in 2014, 2015, or 2016; unfortunately, the currently available

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.³⁹ 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 entrepreneurial 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.⁴⁰ 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.

III “Who,” “when,” and “where”: Which workers learn and gain inspiration from entrepreneurial coworkers, and in which circumstances does this happen?

In this second step of the paper, I address the “who,” “when,” and “where” questions of entrepreneurial learning from coworkers. I begin by showing that the entrepreneurial spillovers are widespread across the economy: workers in almost every sector are more likely to become entrepreneurs after working with entrepreneurial coworkers. But, it turns out that these spillovers are *not* widespread across demographic groups. Instead, spillovers are weak for women and effectively nonexistent for Black Americans, such that learning from entrepreneurial coworkers actually ex-

LEHD ends (with amply available SEIN to FIRMID matching) in 2013.

³⁹In 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.

⁴⁰See Table OA.6 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).

acerbates diversity issues. I conclude by briefly describing other circumstances in which spillovers are weaker or stronger.

III.A Spillovers are common across sectors

Because workplaces and entrepreneurship patterns vary by industry, it is plausible that spillovers may vary dramatically across sectors.⁴¹ In fact, most sectors have similar coefficients to the aggregate coefficient, with some exceptions. Figure 3 shows the extensive margin spillovers by the sector of the individual's current establishment, estimated in a single regression by interacting the share of coworkers who were recently entrepreneurs with indicators for each sector, while continuing to include industry fixed effects that control for baseline differences in future entrepreneurship rates. There appears to be few spillovers for workers in the agriculture, utilities, and health sectors (which likely have high entry costs due to regulation) but substantial spillovers in the accommodation and food services sector.⁴²

The fact that spillovers exist in most sectors but are strongest in the accommodation and food service sector suggests two conclusions. First, these spillovers exist across the economy — these spillovers are commonplace and are not driven by the culture or structure of particular sectors. Second, because the spillovers are largest in the relatively low-technology accommodation and food services sectors, these spillovers are unlikely to be predominantly transmitting knowledge of complex technologies or promoting innovation.⁴³

III.B Spillovers exacerbate diversity issues

In my main sample, only 41% of entrepreneurs are women, despite women making up 47% of the workforce; meanwhile, only 5% of entrepreneurs are Black despite Blacks representing 10% of the workforce (Table 1). These gender and racial gaps are common concerns of policymakers looking to promote minority entrepreneurship. Do these spillovers increase entrepreneurial diversity by giving access to entrepreneurship to more underrepresented minorities? The spillovers are commonplace and have the potential to affect people of different backgrounds and resources, as most workers have coworkers. This contrasts with other forces behind entrepreneurship, such as having wealthy or entrepreneurial parents or having access to higher education. Hence, these spillovers *could* encourage greater diversity in entrepreneurship. However, the scope for this possibility is limited for two reasons, discussed in turn: differential access to entrepreneurial coworkers and differential effects of spillovers. I find substantial demographic gaps in both of these spaces,

⁴¹For instance, [Kerr and Kominers \(2015\)](#) argue that benefits to individual interactions drive clustering of technology firms in Silicon Valley. This suggests that we might see large entrepreneurial spillovers in the information or high tech sector.

⁴²These patterns are similar if I normalize the coefficients by the sector-specific entrepreneurship rate (i.e., the mean outcome). The management sector consists of firms that manage companies and enterprises, such as holding companies and private equity firms.

⁴³Beyond being common across sectors, spillovers also occur across the income distribution. See [OA.IV](#) for details.

such that these spillovers may actually reinforce the gender and racial entrepreneurship gaps.

Access to entrepreneurial coworkers First, access to entrepreneurial coworkers is not equally distributed. Table 3 compares exposure to entrepreneurial coworkers by demographic group, both presenting gaps in raw means and means after residualizing against state and industry fixed effects. The latter tests how entrepreneurship and exposure vary by demographic group, accounting for selection into states and industries.

Columns 1 and 2 demonstrate that men and women on average have similar exposure to entrepreneurial coworkers: on average, 3.4% of men's coworkers have recent entrepreneurial experience, while 3.3% of women's coworkers have recent entrepreneurial experience. This gap flips when I residualize against state and industry fixed effects — i.e., women have slightly lower exposure on average *because* they sort into states and/or industries where there are fewer previous entrepreneurs as potential coworkers.

I see starker differences when I compare (non-Hispanic) White and (non-Hispanic) Black individuals in columns 3 and 4. On average, only 2% of Black workers' coworkers have recent entrepreneurial experience, while 3.5% of White workers' coworkers were entrepreneurs. This gap is halved when I residualize against state and industry fixed effects but remains large: even in the same narrow industry and state, Black workers have lower exposure to entrepreneurial coworkers. This means they have fewer learning opportunities.

Size of spillovers Second, conditional on having access to entrepreneurial coworkers, the spillovers do not operate equally for all demographic groups. I expand model (1) to study in turn how spillovers vary based on sex and race; I interact the exposure variable with the individual's demographics (e.g., sex) and additionally consider the special role of exposure to entrepreneurial coworkers belonging to particular demographic groups (e.g., female entrepreneurial coworkers).

I find stark differences in spillovers across sex and race, as shown in panels A and B of Table 4, respectively. Panel A shows that women seem to experience spillovers *only* if their entrepreneurial coworkers are also women, which is relatively rare. As shown in column 1, women are marginally less likely to become entrepreneurs after working with more entrepreneurial coworkers in general. But, as shown in column 2, this is at least partially offset if those entrepreneurial coworkers are also women. Conditional on the share of her coworkers who were recently entrepreneurs, a woman with a one standard deviation (5.8 percentage points) higher share of coworkers who were recently entrepreneurs *and* who are women is 0.31 percentage points marginally more likely to become an entrepreneur, 10.0% of the mean outcome. Men also seem to experience spillovers disproportionately from their male entrepreneurial colleagues, suggesting that spillovers are predominantly occurring between coworkers of the same sex. This suggests that female entrepreneurship can be boosted by entrepreneurial learning from coworkers *if* those coworkers are also women. Crucially, this is often not the case — while on average 3.4% of all coworkers have recent entrepreneurial

experience, only 1.3% of coworkers have entrepreneurial experience *and* are women, on average.

When we turn to race, we see even starker results: Black workers actually seem to experience negative spillovers, regardless of whether their entrepreneurial coworkers are also Black. As column 1 of panel B shows, Blacks are *less* likely to become entrepreneurs if they work with more entrepreneurial coworkers. Furthermore, these individuals are not more likely to become entrepreneurs when they work with more entrepreneurial coworkers who are also Black (column 2); unlike women, Black individuals do not experience in-group spillovers on average. This is not simply driven by a lack of Black entrepreneurial coworkers teaching entrepreneurial lessons: non-Black individuals *do* appear to learn from their Black entrepreneurial coworkers. Somehow these same lessons are not equally taught (or are available) to Black individuals. Importantly, even if Blacks were learning from Black entrepreneurial coworkers like women learn from female entrepreneurial coworkers, the scope of these spillovers would be highly limited by the lack of Black entrepreneurial coworkers: on average, only 0.1% of coworkers have recent entrepreneurial experience *and* are Black.

There are a variety of reasons for why estimated spillovers may vary by demographic group. For example, even within a workplace, individuals of different demographics may have different interactions with coworkers; I do not directly observe who actually interacts within an establishment, and perhaps some individuals are precluded from relationships with entrepreneurial coworkers due to differences in occupations or tasks.⁴⁴ There are also reasons why spillovers may be stronger within groups. In addition to potentially forming the basis of social or mentor relationships, demographics may also change the type of information that is conveyed in the spillovers. For example, female entrepreneurs may have suggestions for navigating the male-dominated sphere of entrepreneurship. The scope for homophilic mentorships for women is particularly large, given the literature on female mentorship.⁴⁵ Furthermore, the scope for these mentorships in entrepreneur-

⁴⁴This possibility aligns with the pattern that general spillovers are concentrated amongst workers who earn similar amounts. While I do not observe actual peer groups or occupations in the data, I proxy for these with earnings. In untabulated results, I estimate model (1) but interact the exposure variable with whether the coworkers are in the same within-establishment 2004 earnings quartile as the individual. I find that spillovers are largest amongst individuals with similar earnings: conditional on general exposure to entrepreneurial coworkers, if *all* of an individual's entrepreneurial coworkers are also in the same within-establishment earnings quartile as them, their predicted likelihood of subsequent entrepreneurship more than doubles. The coefficient on the share of an individual's coworkers who were recently entrepreneurs is 0.024, and the coefficient on the share of their coworkers who were recently entrepreneurs *and* are in the same earnings quartile as the individual is 0.034. In other words, spillovers are amplified if an individual's entrepreneurial coworkers earn similar amounts, and thus likely work more closely, to them.

⁴⁵For example, [Rocha and Van Praag \(2020\)](#) document that women are more likely to become entrepreneurs after working at female-founded startups in Denmark; [Field et al. \(2016\)](#) find evidence that female friends can catalyze women's entrepreneurial responses to formal business training in India. [Mertz, Ronchi, and Salvestrini \(2023\)](#) argue that exposure to entrepreneurs during adolescence predicts entrepreneurship during adulthood for girls but not boys. [Hampole, Truffa, and Wong \(2021\)](#) find that random exposure to female MBA classmates predicts holding corporate leadership positions in the future for women, suggesting that female classmates facilitate both the transmission of gender-specific information and access to job referrals. See [Ginther et al. \(2020\)](#) for an example of the power of

ship is large, as [Bosma et al. \(2012\)](#) find survey evidence that entrepreneurs' role models tend to be of the same sex and nationality as them. But not all demographic groups necessarily experience mentorship in entrepreneurship, even within demographic groups: [Bennett and Robinson \(2023\)](#) find survey-based evidence that Black prospective entrepreneurs socialize their business ideas less than others, consistent with the patterns I observe.⁴⁶

III.C Other circumstances that affect the strength of spillovers

In this section, I briefly describe other circumstances in which learning from entrepreneurial coworkers is stronger; Appendix [OA.IV](#) provides details.

Spillovers are stronger if coworkers were relatively successful Because entrepreneurial experience can vary vastly in terms of 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. As shown in [Table OA.7](#), conditional on general exposure to entrepreneurial coworkers, individuals who work with more *successful* entrepreneurs are even more likely to become entrepreneurs themselves. That said, even relatively unsuccessful entrepreneurial coworkers encourage entrepreneurship, perhaps because they still enjoyed their entrepreneurship experiences or still learned useful lessons they can pass on to others.⁴⁷

Spillovers are stronger for less experienced workers Entrepreneurial coworkers likely have the strongest capacity to inspire entrepreneurship for individuals with limited experience, i.e., for whom any lessons about entrepreneurship might be new. For example, spillovers are strongest for younger workers, who generally learn from their slightly older (but still relatively young) coworkers, who might be their supervisors or mentors ([Figures OA.1](#) and [Table OA.8](#)). Similarly, spillovers are only relevant for individuals who do not *already* have entrepreneurial experience themselves: individuals with recent entrepreneurial experience themselves have, if anything, negative extensive margin spillovers ([Table OA.8](#)), consistent with previous entrepreneurs have little to learn from the average entrepreneurial coworkers.⁴⁸

female mentorship in economics as a discipline.

⁴⁶One additional reason that Black individuals may not experience spillovers is that, when they have entrepreneurial coworkers, these coworkers may have been less successful as entrepreneurs.

⁴⁷In [Appendix OA.V](#), 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 average American worker. I further explore what the characteristics of coworkers' entrepreneurial firms predict for future entrepreneurs' firms in [Section IV](#).

⁴⁸This 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.

IV “Why” and “how”: When entrepreneurial learning happens, why and how does it happen?

This third and final part of the paper addresses the “why” question of entrepreneurial learning from coworkers: when entrepreneurial learning happens, how and why does it happen? The goal here is to understand the mechanisms of spillovers. When an individual meets an entrepreneurial coworker, are they simply inspired? Or, are they learning entrepreneurial skills that translate into more productive new businesses? Understanding the mechanisms provides insights both for how coworkers shape the entrepreneurial outcomes of workers but also for how these spillovers affect the overall productivity of new firms.

In order to characterize why entrepreneurial spillovers occur, I leverage information on firm outcomes. The idea here is to compare how individuals’ entrepreneurial successes vary with their past exposure to entrepreneurial coworkers. I hypothesize that if entrepreneurial coworkers simply inspire others or teach basic institutional knowledge (e.g., the logistic steps of starting a company), this effectively lowers the entry cost or barrier to entrepreneurship such that *ex ante* lower productivity entrepreneurs should decide to start firms. In this case, I expect the marginal entrepreneur born out of learning from coworkers to have worse outcomes. Alternatively, if entrepreneurial coworkers give advice or provide networks that meaningfully increase the productivity of nascent entrepreneurs, I expect the marginal entrepreneur born out of learning from coworkers to have better outcomes.^{49,50}

Below, I tease out these two potential channels by considering how general entrepreneurial coworkers versus relatively successful entrepreneurial coworkers predict future outcomes. I posit that *if* there is scope for spillovers to increase productivity, it is likely to occur when individuals meet relatively successful entrepreneurial coworkers, who may have entrepreneurial skills to pass on. Average coworkers may be more likely to simply convey happy stories of entrepreneurship; in fact, the average entrepreneurial coworker was — by virtue of now being a coworker — a mediocre entrepreneur.⁵¹ These coworkers were far from superstars and so are unlikely to convey secrets to becoming a productive firm that they did not manage to enact themselves.

I find that individuals who work with more entrepreneurial coworkers tend to start firms that are smaller, less productive, and less likely to grow and continue employing workers compared to other new entrepreneurs; furthermore, these individuals tend to earn less as entrepreneurs. However,

⁴⁹See Appendix OA.I for a detailed conceptual framework.

⁵⁰Appendix OA.III presents additional evidence against several alternative mechanisms, including entrepreneurial coworkers taking individuals along with them for their next venture, teaching generic leadership skills, or providing direct funding or access to financial networks.

⁵¹As Table OA.9 shows, average entrepreneurial coworkers look marginally worse compared to all entrepreneurs in terms of their firms’ survival, employment, payroll, revenue, and revenue per worker. Note that these are imperfect measures of success, and entrepreneurs of “failed” firms need not be discouraged from entrepreneurship themselves, and consequently they need not discourage others. As Dillon and Stanton (2017) document, serial entrepreneurs frequently “dip in and out” of standard wage work.

if the entrepreneurial coworkers themselves ran larger, more productive, and/or growing firms, the individuals are more likely to start firms that too are larger, more productive, and growing. These results suggest the scope for *some* true productivity gains via spillovers from particular entrepreneurs while indicating that the average future entrepreneur exposed to more entrepreneurial coworkers does not start a superstar firm.

IV.A Empirical strategy: Leverage variation in exposure to successful entrepreneurs

In order to study the intensive margin, I estimate an OLS specification with rich controls that leverages cross-individual variation in exposure to entrepreneurial coworkers and to entrepreneurial coworkers with different entrepreneurial firm characteristics. This estimation is restricted to the set of individuals who become entrepreneurs in the near future.

For future entrepreneurs, I estimate models of the form

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

which is identical to model (1) except that now the outcome is some outcome for the firm that individual i starts in the next five years, such as the productivity or size of the firm. I include an additional explanatory variable: the share of individual i 's coworkers who were both entrepreneurs within in the past five years and whose entrepreneurial firm had some outcome (e.g., survived to a second year or was particularly large or productive). In some estimates of the model, I include entrepreneurial firm industry fixed effects in order to test whether more exposed individuals simply tend to start firms in, e.g., less productive industries.

IV.B Main results: Mixed intensive margin spillovers

Estimates from the above empirical strategy present a nuanced picture. Individuals who work with more entrepreneurial coworkers tend to start firms that are shorter-surviving and smaller and tend to earn less as entrepreneurs. However, if these entrepreneurial coworkers themselves ran longer-surviving, larger, and/or more productive, these patterns (at least partially) reverse.

I estimate model (2) for several metrics of how “successful” entrepreneurs are for the 2004 sample; Tables 5 and 6 present the main results. I begin in columns 1-4 of Table 5 by considering a simple measure of firm success: survival.⁵² Do future entrepreneurs start longer-surviving firms if they worked with more entrepreneurial coworkers, especially those who started longer-surviving firms? As columns 1 and 3 show, general exposure to more former entrepreneurs is associated with a lower likelihood of firm survival to both a second and fifth year, although the coefficient

⁵²Survival is measured by the continued employment of workers.

is economically small.^{53,54} However, exposure to former entrepreneurs whose own firms survived after entry is associated with a higher likelihood of starting a firm that survives after entry, as shown in columns 2 and 4, though this generally does not fully offset the negative effect from general exposure.^{55,56}

Beyond firm survival, I explore other measures of firm success, including size, in terms of employment, payroll, revenue, and revenue productivity. As shown in Table 5 (and Table OA.11), the patterns are generally similar to those for firm survival: individuals who work with more entrepreneurs tend to start “worse” firms, unless their entrepreneurial coworkers themselves were successful. For example, in column 5 of Table 5, I find that a one standard deviation (14.7 percentage point) increase in the share of coworkers who were recently entrepreneurs predicts 5.5% lower entry year employment. Yet, as column 6 shows, this relationship turns positive if the entrepreneurial coworkers ran large firms.⁵⁷ Columns 7 and 8 show similar patterns for the likelihood of a future entrepreneur’s firm being in the top 10% of entry year employment, relative to firms that enter in the same year and industry. These specifications measure whether a future entrepreneur’s prospects of being a “top” entrepreneur depend on whether their entrepreneurial lessons came from “top” former entrepreneurs. Table OA.11 presents analogous specifications for entry year payroll, revenue, and revenue per worker, and demonstrates that the results are robust to the inclusion of

⁵³A one standard deviation (14.7 percentage point) increase in the share of coworkers with entrepreneurship is associated with a 0.14 percentage point lower likelihood of having an entrepreneurial firm that survives to a second year, a 0.17% decrease relative to the mean likelihood (column 1).

⁵⁴As Table OA.10, the estimates for firm survival are robust to the inclusion of entrepreneurial firm industry and entry year fixed effects, such that the patterns are not driven by more exposed entrepreneurs entering particular sectors or in particular years.

⁵⁵While I provide evidence in Section II in support of interpreting the extensive margin results as causal, it is possible that the causal interpretation does not extend to the intensive margin results. Specifically, while exposure to entrepreneurs in general may be quasi-random, exposure to successful entrepreneurs may not be; for example, having productive entrepreneurs as coworkers may reflect that an individual has high latent productivity themselves. However, note that my baseline regressions already control for the individuals’ earnings, which should reflect some of their productivity. Additionally, I conduct robustness for these survival regressions by controlling for the individuals’ firms’ productivity (see columns 9 and 10 of Table OA.10); if high-productivity individuals and coworkers cluster at high-productivity firms, control for firm productivity should (at least partially) account for any bias generated by this clustering.

⁵⁶It is worth noting that the effect of exposure to more successful entrepreneurial coworkers, by the metric of survival, may be conflated by the extent of interaction between the individual and their coworkers. That is, suppose an entrepreneurial coworker started a firm in the past five years that continues to employ workers several years after entry, yet they are now working at the current firm (unless they are the entrepreneur of the current firm). This could have two implications for the types of interactions this coworker would have with others. First, they may have only joined the firm very recently, meaning that they might have had limited interactions with others. Second, if they joined less recently, then perhaps they were less influential at their entrepreneurial firm (since they may have left it shortly after the firm entered), making their experience less informative for potential entrepreneurs.

⁵⁷Individuals start larger firms if their entrepreneurial coworkers’ firms were in the top 10% of entry year employment, amongst firms that entered in the same year and industry: conditional on general exposure to entrepreneurial coworkers, a future entrepreneur with a one standard deviation (3.8 percentage point) higher share of coworkers who were entrepreneurs of particularly large firms has 4.3% higher entry year employment.

entrepreneurial firm industry fixed effects. Regardless of firm outcome, individuals are more likely to become successful as entrepreneurs in the future if their coworkers ran relatively successful firms.^{58,59}

Finally, I consider the (labor market) earnings of entrepreneurs themselves. Consistent with having less success on average, individuals exposed to more entrepreneurial coworkers also earn lower pay as entrepreneurs compared to other new entrepreneurs, as shown in Table 6, regardless of their entry year or industry. A one standard deviation (14.7 percentage point) increase in the share of coworkers who were entrepreneurs predicts that a future entrepreneur's entry year earnings will be 2.3% lower. Consistent with the previous results, future entrepreneurs who work with more successful entrepreneurs are more likely to have higher earnings, conditional on their general exposure.

Taken together, these results suggest that average entrepreneurial coworkers are simply inspiring or teaching basic information to nascent entrepreneurs, which in turn allows less productive entrepreneurs to choose to enter. Yet, the fact that relatively successful entrepreneurial coworkers prompt successful entrepreneurship suggests that *some* of these spillovers translate into productivity gains.

It is tempting to conclude that many of these individuals are making a sub-optimal decision to become an entrepreneur and that their entrepreneurial coworkers are "leading them astray." However, it is important to remember that individuals become entrepreneurs for many reasons; for instance, some entrepreneurs simply enjoy being their own boss, so even running a less successful firm may be preferable to standard work. Furthermore, my metrics for firm success may not reflect how entrepreneurs view success; some individuals may become entrepreneurs as temporary ventures, such that they may not desire a long-surviving firm. Understanding entrepreneur welfare, like any welfare, is inherently difficult to do using administrative data, and so evaluating the individual-level welfare implications of these spillovers is beyond the scope of this paper.

Additional outcomes In Appendix OA.IV, I find that exposure does not predict a higher likelihood of extreme success, as measured by making an initial public offering (IPO). Furthermore, exposed individuals tend to start firms that are less innovative, generating fewer patents, copyrights, and trademarks. In some cases, entrepreneurs are more likely to start firms in the sectors in

⁵⁸The one exception is in terms of revenue productivity, where on its own, general exposure to entrepreneurs predicts a marginally higher probability of starting a particularly productive firm (column 5), but this appears to be driven by the particularly productive coworkers (column 6). Conditional on exposure to entrepreneurial coworkers, a future entrepreneur who works with a one standard deviation (4.5 percentage point) higher share of coworkers who were entrepreneurs at particular high-productivity firms is on average 0.6 percentage points more likely to run a particularly productive firm, a 9.9% increase relative to the mean outcome. Estimates based on the revenue and productivity measures, which come from the LBD, should be interpreted with some caution because the LBD has missing revenue data for some firms due to nonresponse or data linkage issues; additionally, the revenue data is a research dataset and may be processed further by the Census.

⁵⁹In untabulated results, I show that these patterns hold too for female and Black entrepreneurs.

which their entrepreneurial coworkers ran firms, consistent with entrepreneurial coworkers transmitting sector-specific knowledge or connecting individuals with production or sales networks in a particular industry. 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 have financing from family members).

Taken together, these additional outcomes highlight that, for the majority of individuals, these spillovers provide a pathway from regular work to entrepreneurship without conveying advanced skills or other tools for success. Generally faced with relatively unsuccessful former entrepreneurs, individuals are learning simple lessons, such as the basic logistics of starting a firm or the benefits of being your own boss. These coworkers are not generally teaching lessons on management practices, how to source financial capital, or the road to being a superstar.

V Conclusion

Workplace social connections affect the landscape of entrepreneurship. By bringing together individuals with different experiences, workplaces can serve as hubs for new entrepreneurship. Indeed, individuals who work with more entrepreneurial coworkers appear to be inspired by those coworkers and start firms of their own. While *what* they are learning in these relationships is difficult to pin down precisely, patterns about firms' success suggest that *what* individuals learn from their entrepreneurial coworkers depends on *what* those coworkers have to teach. The relatively successful entrepreneurs possess teachable skills that may improve future firms' productivity, while the less successful entrepreneurs may still have institutional knowledge that reduces the entry cost to entrepreneurship without improving productivity. Yet, not everyone experiences these spillovers. Both *access* to and the *effect* of entrepreneurial spillovers vary by demographic group, such that women and Black individuals experience substantially fewer opportunities to launch new entrepreneurial careers out of these connections.

What do these findings mean for policymakers? This paper demonstrates the “status quo” of entrepreneurial spillovers across individuals in the workplace. The presence of these spillovers suggests that there are many individuals who could become entrepreneurs under the “right” circumstances — people are nudged towards entrepreneurship after working with former entrepreneurs. But, because most entrepreneurial coworkers were not superstars, these spillovers are limited in their ability to increase productivity dramatically. Furthermore, underrepresented demographic groups in entrepreneurship are frequently excluded from or not impacted by these spillover opportunities. As a consequence, policymakers may have to push beyond this status quo in order to generate productivity gains and greater entrepreneurial diversity.

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Table 1: Individuals who become entrepreneurs are different from the average worker

| | All Individuals | | | Future Entrepreneurs | | | T-Stat |
|--|-----------------|----------------|--------------|----------------------|----------------|--------------|----------------|
| | Mean (1) | Std Dev (2) | N (M) (3) | Mean (4) | Std Dev (5) | N (M) (6) | (4)-(1) (7) |
| Panel A: Entrepreneurship | | | | | | | |
| Recent entrepreneur | 0.034 | 0.180 | 46.68 | 0.090 | 0.287 | 1.456 | 237.0 |
| Current entrepreneur | 0.009 | 0.096 | 46.68 | 0.032 | 0.175 | 1.456 | 152.8 |
| Future entrepreneur | 0.031 | 0.174 | 46.68 | 1.000 | 0.000 | 1.456 | 38084.6 |
| Share cow. entr. | 0.034 | 0.095 | 46.68 | 0.064 | 0.147 | 1.456 | 248.0 |
| Share cow. survived, age 2 | 0.029 | 0.093 | 46.68 | 0.057 | 0.143 | 1.456 | 234.9 |
| Share cow. survived, age 5 | 0.021 | 0.083 | 46.68 | 0.038 | 0.118 | 1.456 | 170.4 |
| Panel B: Demographics | | | | | | | |
| Female | 0.47 | 0.50 | 46.68 | 0.41 | 0.49 | 1.456 | -135.8 |
| White | 0.73 | 0.44 | 36.370 | 0.78 | 0.41 | 1.129 | 122.8 |
| Black | 0.10 | 0.30 | 36.370 | 0.05 | 0.21 | 1.129 | -269.3 |
| Native American | 0.01 | 0.08 | 36.370 | 0.01 | 0.08 | 1.129 | -19.4 |
| Asian | 0.05 | 0.22 | 36.370 | 0.07 | 0.25 | 1.129 | 60.3 |
| Hispanic | 0.10 | 0.29 | 36.370 | 0.09 | 0.29 | 1.129 | -22.1 |
| Age | 39.09 | 11.83 | 46.68 | 37.39 | 11.00 | 1.456 | -183.2 |
| High school | 0.28 | 0.45 | 4.234 | 0.25 | 0.44 | 125,000 | -17.0 |
| Some college | 0.34 | 0.48 | 4.234 | 0.34 | 0.47 | 125,000 | -4.3 |
| College | 0.26 | 0.44 | 4.234 | 0.30 | 0.46 | 125,000 | 29.3 |
| Born outside the U.S. | 0.18 | 0.39 | 46.68 | 0.20 | 0.40 | 1.456 | 64.7 |
| Panel C: 2004 Job Characteristics | | | | | | | |
| Annual earning | 37,240 | 155,300 | 46.68 | 41,140 | 185,400 | 1.456 | 25.1 |
| Log(annual earnings) | 9.76 | 1.51 | 46.68 | 9.82 | 1.43 | 1.456 | 49.9 |
| Years since joined firm | 3.97 | 3.15 | 46.68 | 3.53 | 2.90 | 1.456 | -182.5 |
| Years until leave firm | 3.04 | 3.07 | 46.68 | 1.58 | 2.02 | 1.456 | -844.3 |
| Panel D: 2004 Establishment Characteristics | | | | | | | |
| Log(employment) | 5.42 | 2.46 | 46.68 | 4.08 | 2.35 | 1.456 | -675.5 |
| Firm age | 8.95 | 3.25 | 46.68 | 7.96 | 3.65 | 1.456 | -322.3 |

Note: This table compares entrepreneurial, demographic, job, and establishment characteristics for all individuals in 2004 vs. the subset of those individuals who become entrepreneurs between 2005 and 2009. Recent entrepreneurship is entrepreneurship between 1999 and 2003; current entrepreneurship is entrepreneurship in 2004. “Share cow. entr.” indicates the share of the individual’s coworkers who were recent entrepreneurs; “Share cow. survived, age [A]” indicates the share of the individual’s coworkers who were recent entrepreneurs and whose firms survived to an A-th year after entry. Demographics are only reported for individuals with non-imputed values. Note that all categories within a demographic category are mutually exclusive, e.g., Black identifies non-Hispanic Blacks. Note that the variance of log(annual earnings) is higher than what is typically found in the inequality literature because (a) I do not drop individuals earning below minimum wage, and (b) I do not drop individuals who appear at their primary firm for less than the full year. Observation counts are in millions, as denoted in the header by “M”.

Table 2: Exposure to entrepreneurial coworkers predicts future entrepreneurship

| <i>Sample:</i> | Dependent Variable: Entrepreneur Within Next 5 Years | | | | | | |
|---|--|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | 2004 Cross-Section | | | | | '03-'04 Panel | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Share of coworkers w/ entrepreneurship | 0.056*** (0.001) | 0.039*** (0.001) | 0.038*** (0.001) | 0.035*** (0.001) | 0.025*** (0.001) | 0.021*** (0.001) | 0.014*** (0.001) |
| Log employment | x | x | x | x | x | x | x |
| Previous entr. | | x | x | x | x | x | x |
| Demographics, earnings | | | x | x | x | x | x |
| State FE | | | | x | x | x | x |
| Industry FE | | | | | x | x | x |
| Year FE | | | | | | x | x |
| Firm age FE | | | | | | x | x |
| Establishment FE | | | | | | | x |

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

Note: This table presents evidence of positive extensive margins spillovers. The table presents regressions performed on either the sample of individuals in 2004 (columns 1-5) or an extended panel of individuals in 2003 and 2004 (columns 6-7). The first five columns gradually build up model (1), slowly adding controls as demonstrated in the table footer.

The last two columns present one robustness result in which I include establishment fixed effects, showing that variation in exposure to entrepreneurial coworkers *within*-establishment over time predicts future entrepreneurship; I interpret the drop in coefficient from column 6 to 7 with the inclusion of establishment fixed effects a quantification of how much selection of entrepreneurial individuals into entrepreneurial firms may underlie the main result in column 5. Because time variation in values such as the presence of entrepreneurial coworkers *within* an establishment could represent establishment or firm life cycle patterns, I include firm age fixed effects (and an indicator for whether firm age is censored due to the start time of the underlying data). Note that in columns 6 and 7, individuals are not required to be at the same establishment in both years; thus, identifying variation of these regressions comes both from individuals and coworkers joining and/or leaving their establishment in either year and the timing of entrepreneurship.

Standard errors are robust and clustered at the establishment level.

Columns 1-5: N=46,680,000. Mean of dependent variable: 0.031. Mean (std dev) of share of coworkers with entrepreneurship: 0.034 (0.095).

Columns 6-7: N=92,820,000. Mean of dependent variable: 0.032. Mean (std dev) of share of coworkers with entrepreneurship: 0.034 (0.095).

Table 3: Exposure to entrepreneurial coworkers varies by demographic group

| | Sex | | Race | |
|--|------------|--------------|--------------|--------------|
| | Men (1) | Women (2) | White (3) | Black (4) |
| Mean share of coworkers w/ entrepreneurship | 0.034 | 0.033 | 0.035 | 0.020 |
| Gap relative to majority group (men or Whites) | | -0.001 | | -0.015 |
| Gap relative to majority group, residualized against industry and state | | 0.001 | | -0.007 |
| N (Millions) | 21.89 | 24.80 | 26.58 | 7.71 |

Note: This table demonstrates that exposure to entrepreneurial coworkers varies by demographic group. The first row presents the average share of coworkers with entrepreneurial experience, by demographic group. The second row presents the gap between demographic groups (i.e., average share for women minus men in columns 1 and 2; average share for non-Hispanic Blacks minus non-Hispanic Whites in columns 3 and 4). The third row presents the similar gaps with exposure residualized against industry (NAICS6) and state fixed effects in order to account for worker sorting across industry and geography.

Taken together, columns 1 and 2 show that women are less likely than men to be exposed by entrepreneurial coworkers, but this difference in exposure is accounted for by selection into different states and/or industries — women work in states and/or industries where there are fewer previous entrepreneurs as potential coworkers. Columns 3 and 4 show that Blacks have lower exposure to entrepreneurial coworkers than Whites, and this gap is still pronounced conditional on industry and state sorting.

Table 4: Spillovers largely occur within-demographic group, if at all

| | Dep Var: Entrepreneur 2005-2009 | |
|--|---------------------------------|----------------------|
| | (1) | (2) |
| Panel A: Women learn from women, men learn from men | | |
| Share of coworkers with entrepreneurship | 0.035*** (0.001) | 0.047*** (0.001) |
| $\mathbb{1}\{\text{Woman}\} \times$ Share of coworkers with entrepreneurship | -0.020*** (0.001) | -0.041*** (0.001) |
| Share of coworkers with entr. <i>and</i> who are women | | -0.037*** (0.002) |
| $\mathbb{1}\{\text{Woman}\} \times$ Share of coworkers with entr. <i>and</i> who are women | | 0.054*** (0.002) |
| Panel B: Blacks do not learn from anyone | | |
| Share of coworkers with entrepreneurship | 0.022*** (0.001) | 0.021*** (0.001) |
| $\mathbb{1}\{\text{Black}\} \times$ Share of coworkers with entrepreneurship | -0.028*** (0.002) | -0.026*** (0.003) |
| Share of coworkers with entr. <i>and</i> who are Blacks | | 0.022*** (0.005) |
| $\mathbb{1}\{\text{Black}\} \times$ Share of coworkers with entr. <i>and</i> who are Blacks | | -0.023*** (0.007) |

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

Note: This table explores heterogeneity in spillovers by demographic group by adapting column 5 of Table 2 by assessing the demographics of both the focal individual and their entrepreneurial coworkers; to assess marginal effects for different groups, sum coefficients across rows. Column 1 presents demographic differences in learning from average entrepreneurial coworkers, while column 2 explores within-group learning.

Panel A shows that women are marginally less likely than men to become entrepreneurs after working with entrepreneurial coworkers (i.e., row 2 is negative) and that spillovers are predominantly within-gender, with women more likely to become entrepreneurs if their entrepreneurial coworkers are women (row 3+4 is positive). Men are marginally less likely to become entrepreneurs if their entrepreneurial coworkers are women (row 3 is negative). Panel B shows that (non-Hispanic) Blacks experience no spillovers on average, regardless of race.

All columns include model (1) controls, including demographic controls. Column 2 also controls for the share of coworkers in the relevant group (e.g., women or Blacks) as well as the interaction between the group and that share (e.g., woman \times share of coworkers who are women).

Panel A N=46,680,000. Panel B N = 36,370,000 (smaller due to restricting to non-imputed race/ethnicity). Standard errors are robust and clustered at the establishment level.

Mean of dependent variable for men: 0.035; women: 0.027; Whites: 0.033; Blacks: 0.014.

Mean (std dev) of share of coworkers with entrepreneurship: 0.034 (0.095); share of coworkers with entrepreneurship and who are women: 0.013 (0.058); share of coworkers with entrepreneurship and who are Black: 0.001 (0.013).

Table 5: New firms mimic entrepreneurial coworkers' firms in success

| | Dependent Variable: 2005-2009 Entrepreneurial Firm Outcome | | | | | | | |
|---|--|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Survive to age 2 | | Survive to age 5 | | Entry year log emp | | Emp in top 10% | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Share of coworkers with entrepreneurship | -0.010*** (0.003) | -0.039*** (0.011) | -0.034*** (0.003) | -0.057*** (0.005) | -0.381*** (0.007) | -0.441*** (0.007) | -0.088*** (0.002) | -0.106*** (0.002) |
| Additional effects: | | | | | | | | |
| Share of coworkers with entr. whose firm survived to age 2 | | 0.031*** (0.011) | | | | | | |
| Share of coworkers with entr. whose firm survived to age 5 | | | | 0.036*** (0.006) | | | | |
| Share of coworkers with entr. whose firm was in top 10% emp | | | | | | 1.104*** (0.029) | | 0.334*** (0.011) |
| Model (1) controls | x | x | x | x | x | x | x | x |
| Mean(dep var) | 0.815 | 0.815 | 0.536 | 0.536 | 1.928 | 1.928 | 0.168 | 0.168 |
| Mean(share with entr. in add. effects) | | 0.057 | | 0.038 | | 0.009 | | 0.009 |
| Std dev(share with entr. in add. effects) | | 0.143 | | 0.118 | | 0.038 | | 0.038 |

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

Note: This table presents evidence of the productivity implications of spillovers. The columns present estimates of model (2) for individuals who become entrepreneurs between 2005 and 2009 for different measures of firm survival, with model (1) controls. The covariate “Share of coworkers with entr. whose firm survived to age 2(5)” is the share of coworkers who were recently entrepreneurs and whose firm survived to age 2 or 5. For example, column 2 tests whether an individual’s entrepreneurial firm is more likely to survive to age 2 if in 2004 they worked with (a) a higher share of coworkers who were entrepreneurs, and (b) a higher share of coworkers who were entrepreneurs of firms that survived to age 2. The covariate “Share of coworkers with entr. whose firm was in top 10% emp” 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 entry year employment. (Means and standard deviations for these variables are in the footer.)

Standard errors 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). See Tables OA.10 and OA.11 for robustness to the inclusion of entrepreneurial industry and entry year fixed effects.

Table 6: Entrepreneurs' wages mimic entrepreneurial coworkers' firms in success

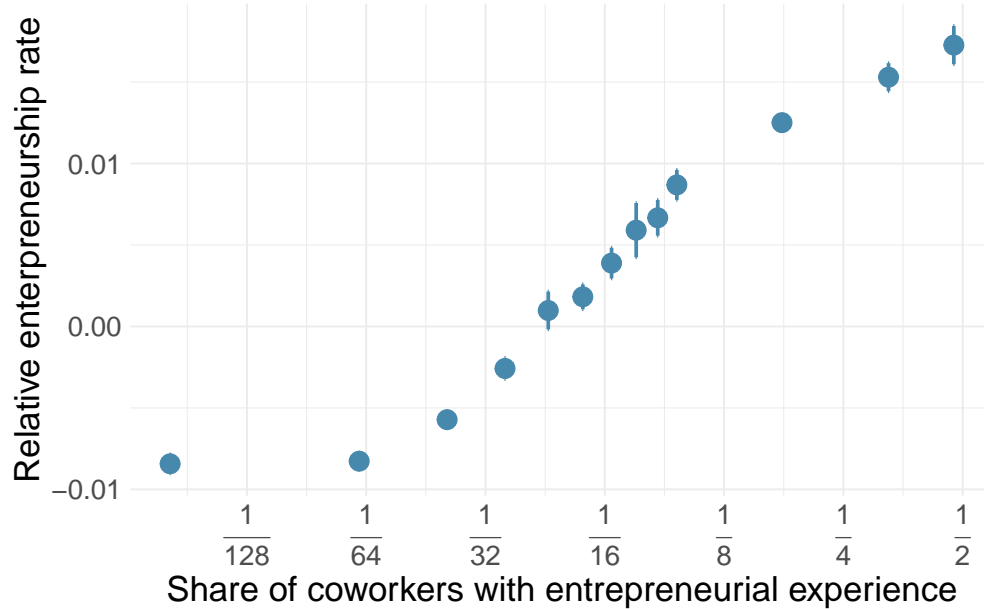
| | Dependent Variable: Entry Year Log(Earnings) as Entrepreneur 2005-2009 | | | |
|---|---|----------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) |
| Share of coworkers with entrepreneurship | -0.164*** (0.007) | -0.160*** (0.007) | -0.184*** (0.007) | -0.178*** (0.007) |
| Additional effects: | | | | |
| Share of coworkers with entr. whose firm was in top 10% emp | | | 0.357*** (0.026) | 0.339*** (0.026) |
| Model (1) controls | x | x | x | x |
| Entrepreneurial industry-Entry year FE | | x | | x |

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

Note: This table presents evidence that future entrepreneurs' labor earnings as entrepreneurs depend on the relative success of their entrepreneurial coworkers' firms. The table presents regressions performed on the sample of individuals who become entrepreneurs between 2005 and 2009. The columns present estimates of model (2) for the wage and salary income that the entrepreneur earns at their entrepreneurial firm in its entry year, 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). "Entrepreneurial industry-Entry year FE" indicate (entry year 6-digit) industry-by-entry year fixed effects. The second reported variable ("top 10%") is the share of coworkers who were entrepreneurs and whose entrepreneurial firm's entry year employment was in the top 10% of firms that entered in the same year and 6-digit industry.

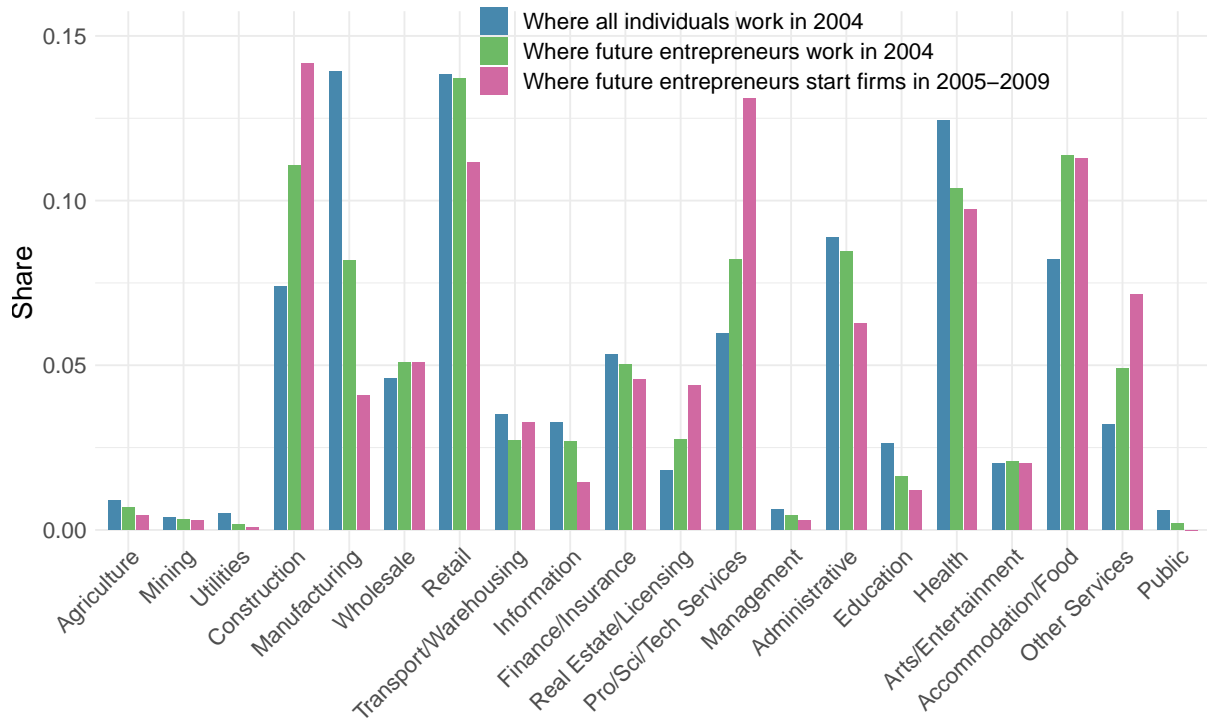
Standard errors are robust and clustered at the establishment level. N=1,456,000. Mean of dep var is 9.832. Mean (std dev) of share is 0.064 (0.147). Mean (std dev) of share top 10% is 0.009 (0.038).

Figure 1: Working with entrepreneurial coworkers predicts entrepreneurship



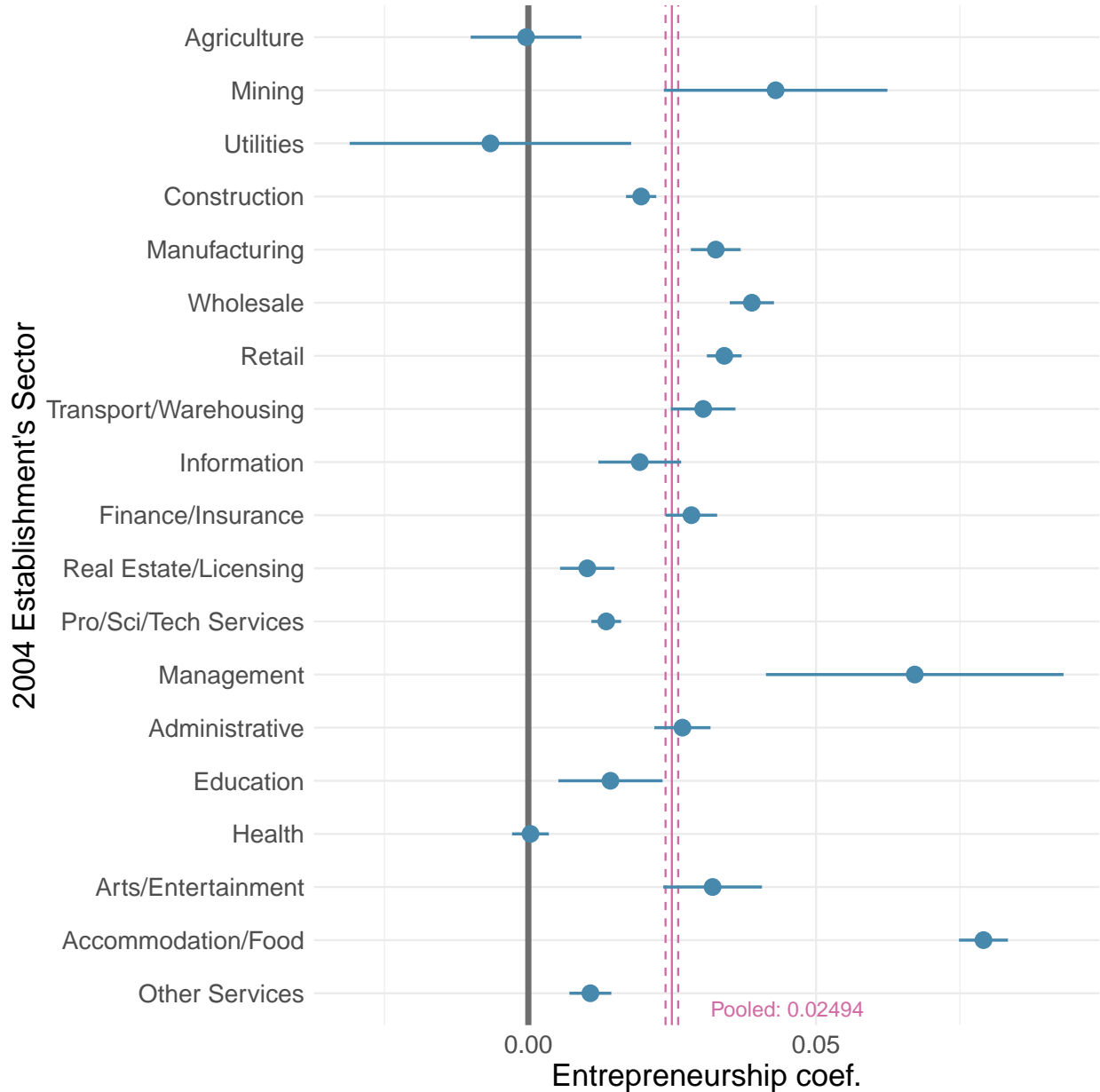
Note: This figure demonstrates that workers who work with larger shares of coworkers with past entrepreneurial experience are more likely to become entrepreneurs in the future, conditional on controls. The figure presents the estimated coefficients from binscatter version of model (1), where the share of coworkers with entrepreneurial experience is replaced by indicators for having the share fall in different bins, e.g., between 0 and 0.01, 0.01, and 0.02, etc; the omitted bin is the indicator for having the share equal to zero (for expositional purposes, bins for coworker shares greater than 0.55 are excluded from the figure; fewer than 0.5% of workers fall into these bins). See column 5 of Table 2 for comparable linear specification.

Figure 2: Entrepreneurial individuals work and start firms across the economy



Note: This figure plots the distributions of sectors of 2004 primary firms for all individuals and for future (2005-2009) entrepreneurs, as well as the distribution of sectors in which the future entrepreneurs start firms. The NAICS codes map to sectors as follows (note that some sector names are abbreviated in the figure): 11: Agriculture, Forestry, Fishing and Hunting; 21: Mining, Quarrying, and Oil and Gas Extraction; 22: Utilities; 23: Construction; 31-33: Manufacturing; 42: Wholesale Trade; 44-45: Retail Trade; 48-49: Transportation and Warehousing; 51: Information; 52: Finance and Insurance; 53: Real Estate and Rental and Leasing; 54: Professional, Scientific, and Technical Services; 55: Management of Companies and Enterprises; 56: Administrative and Support and Waste Management and Remediation Services; 61: Educational Services; 62: Health Care and Social Assistance; 71: Arts, Entertainment, and Recreation; 72: Accommodation and Food Services; 81: Other Services (except Public Administration); 91: Public Administration.

Figure 3: Entrepreneurial spillovers vary by sector



Note: This figure presents evidence that extensive margin spillovers exist in most sectors of the economy. The figure presents regression coefficient and 95% confidence interval estimates of an adapted version of model (1), performed on the sample of individuals in 2004, in which I replace the explanatory variable (share of coworkers who were entrepreneurs in the past 5 years) with the share of coworkers who were entrepreneurs in the past 5 years interacted with the sector of the 2004 establishment (SEIN). I exclude the coefficient for workers in the public sector here, who account for less than 0.5% of the sample, whose coefficient is substantially different and very noisy (coefficient -0.3163 , standard error 0.010). See Figure 2 for NAICS codes of each sector.

A.I Data appendix

In this section, I present additional details on how I construct several variables from U.S. Census Bureau datasets, which are described with fewer details in Section I.

A.I.A Longitudinal Employer Household Dynamics (LEHD)

The LEHD is the crucial source of data for this paper, as I use the LEHD both to identify entrepreneurs and to connect individuals with their coworkers. The LEHD is constructed from firm-side state unemployment insurance (UI) records. It contains quarterly information on employment and earnings for most individuals within a state, with longitudinal employer and individual identifiers that can be followed across states. These longitudinal identifiers allow me to track the entrepreneurial outcomes of individuals and their coworkers over time. I use LEHD data from 1993 to 2013 for a balanced sample of 18 states.⁶⁰

The LEHD contains information on earnings and demographics. The earnings include salaries and wages as well as bonuses, stock options, and other cash pay, allowing me to find top (labor income) earnings at each firm; this allows me to identify entrepreneurs as top earners. I use the CPI-U from the Bureau of Labor Statistics (BLS) to deflate earnings measures to 2010 dollars. The LEHD also contains demographic information for individuals, including date of birth, sex, race/ethnicity, education, and country of birth, which allows me to explore the heterogeneity of entrepreneurial spillovers.⁶¹ I define an individual's age in a year as the difference between the year and the individual's year of birth (such that their age is their age on December 31st of that year) and restrict to individuals aged 20-69.⁶²

Using the LEHD, I study employers at two levels of aggregation. First, the least aggregated firm unit with known employees within the LEHD is a state-level unemployment insurance account (called a State Employer Identification Number, or SEIN).⁶³ I refer to this unit as an **establishment**, but note that this unit can contain multiple physical establishments of a single firm within a given state. That is, an SEIN is a tax ID number that pools together physical establishments of a firm within a given state, generally within a given sector. I primarily study individuals and

⁶⁰This results in a balanced panel of the following 18 states: AK, AZ, CA, CO, FL, ID, IL, IN, KS, LA, MD, MO, MT, NC, OR, WA, WI, WY. In 2013, these states account for 43.0% of total (pay period including March 12) employment, 44.8% of firms, and 44.4% of establishments in the U.S. (50 states and D.C.), estimated using the Business Dynamics Statistics dataset (the public tabulations of the U.S. Census Bureau's Longitudinal Business Database). Other states have incomplete or fluctuating coverage over this time period and so are excluded in order to create a balanced panel of states; the LEHD does have data in previous years for a handful of states, but I choose to start in 1993 in order to get as many states as I can while still maintaining a long panel.

⁶¹The demographic information is drawn from other Census and government datasets, mostly the Decennial Censuses and the Social Security Administration's Numident file. Coverage is imperfect, and while the Census does impute missing values, I only use variation from the non-imputed values.

⁶²When I study future entrepreneurship, I restrict to individuals aged 20-64, for all of whom I can study entrepreneurship in the next five years up to the age of 69.

⁶³Note that the U.S. Census Bureau assigns individuals within an SEIN to distinct locations, called SEIN-units; this is an imputation and thus cannot be reliably used to study spillovers across coworkers.

their coworkers (i.e., other workers) at the SEIN level, since I assume that individuals have the most contact within their firm with coworkers at the same SEIN. Second, for my measures of firm outcomes (and robustness for coworkers), I study firms, pooling across states and sectors. That is, a **firm** consists of all establishments belonging to the same national firm, within my sample of states.⁶⁴ Note that for firms that only exist in my sample of states, my measure of a firm captures the entire firm; for firms that exist in states outside of my sample, my measure of a firm will only capture part of the firm.

The LEHD provides detailed information on the industry of each establishment, which is useful both for controlling for industry patterns to entrepreneurship and for exploring heterogeneity and mechanisms. I use the 6-digit NAICS codes⁶⁵ to group establishments by industry. For each firm, I assign the sector (approximately 2-digit NAICS codes) with the majority of employees, summing across establishments.

The LEHD covers almost all sectors of the economy, making it an ideal source for studying entrepreneurial spillovers in a broad context and sectoral heterogeneity. Namely, it includes workers covered by the UI system (i.e., workers who could claim UI benefits if they experience an eligible dismissal from their employer); in 1994, this mass of workers reflected about 96% of employment and 92.5% of wages and salaries (BLS (1997, pg. 42)). Due to the nature of the UI system, the data does not include small non-profits, self-employed workers, some agricultural workers, and federal government workers.⁶⁶ Note that this nature of the LEHD means that some firm owners, especially sole proprietors, are not covered by the LEHD because they do not take labor income earnings (Hyatt, Murray, and Sandusky (2020)); I discuss how this affects my definition of entrepreneurship in Section I.

For each individual, I define a **primary firm** and **primary establishment** for each year. An individual's primary firm is the firm from which they earn the most in the year (summing across all establishments) and thus at which they presumably spend the most time; their primary establishment is the establishment at their primary firm at which they earn the most in the year. Below, I measure characteristics of an individual's **coworkers**, who are other workers at the individual's primary establishment in a given year, for whom the establishment is also their primary establishment. I restrict all samples to individuals with at least one coworker, i.e., individuals at establishments

⁶⁴That is, I combine all SEINs that map to the national Census variable FIRMID, using the LEHD's ECFT26 crosswalk. The FIRMID variable allows me to connect individuals in the LEHD to firm outcomes in the remaining datasets.

⁶⁵I use the 2012 "FNL" NAICS codes that source industry information from both the Covered Employment and Wages program and the LBD (Vilhuber, McKinney et al. (2014)). 6-digit NAICS codes are the most disaggregated industry codes available and are quite narrow. For example, NAICS 311111 consists of firms that manufacture dog and cat food, while NAICS 311119 consists of firms that manufacture food for other animals; and NAICS 441110 consists of automobile dealers that sell new cars, while NAICS 441120 consists of dealers that sell used cars.

⁶⁶For details, see Kornfeld and Bloom (1999, pg. 173), BLS (1997, pg. 43) and <http://workforsecurity.doleta.gov/unemploy/pdf/uilawcompar/2012/coverage.pdf>.

with at least two workers (from whom the establishment is their primary establishment).

In an attempt to assess the quality of firms, I measure several outcomes in the LEHD. I proxy firm survival by tracking whether a new firm continues to employ individuals in the years after it enters; e.g., a firm survives to a second year if it employs individuals (counting all earners at the firm, regardless of whether the firm is the earners' primary firm, in my sample of states) in the year after it enters.⁶⁷ I also measure total employment and payroll levels and growth, including all individuals who have earnings at a firm in a given year (i.e., not restricting to individuals for whom the firm is their primary firm). Finally, I flag firms that are particularly large or fast-growing, by identifying firms whose employment levels or growth fall in the top 10% of the given measure among firms that entered in the same year, in the same (6-digit NAICS) industry.

Measuring entrepreneurship While there are several ways of measuring entrepreneurship, I follow the recent literature and call an individual an entrepreneur if they are a top three earner at a new firm, although I conduct a variety of robustness and audit checks on this definition. This measure of entrepreneurship captures individuals who likely hold influential positions at young firms.

In this paper, I consider a broad notion of entrepreneurship. I am interested in the founding of firms, so I take an “initial team” approach to defining and measuring entrepreneurship. That is, I call an individual an entrepreneur if they are amongst the three highest-paid employees of a firm in the first year that the firm has paid employees.⁶⁸

In order to enact this definition, I determine the year in which a firm enters. I follow the literature and start by finding the first year a firm has positive employment in the national LBD, i.e., the first year the firm's oldest establishment has employment in the payroll period that contains March 12 (Haltiwanger, Jarmin, and Miranda (2013, pg. 353)).⁶⁹ I use this first year as each firm's **entry year**, with minor adjustments. First, some firms, particularly small and new ones, appear in the LEHD without appearing in the LBD. Second, some firms appear in the LEHD years before or after they first appear in the LBD.⁷⁰ For firms in either of these two cases, I take the first year

⁶⁷In some cases, firms “dip in and out” of employment within the LEHD, such that a firm may appear to not survive to the second year after entry but then reappears in the third year after entry.

⁶⁸I follow Agarwal et al. (2016), Kerr and Kerr (2017), and Azoulay et al. (2018) in doing this; Azoulay et al. (2018) audits this initial team definition using W-2 records to compare founders to initial team members. They find that “90% of the owner-workers are in fact among the top three earners in the firm during the first year,” though this coverage is noisy.

⁶⁹Note that the LBD begins in 1976, such that firm entry years are left censored in 1976. I focus on entrepreneurship, and thus firm entry, between 1994 and 2013, so this censorship is not relevant.

⁷⁰A firm may appear in the LEHD before it appears in the LBD because of the structure of the LBD: because LBD employment is based on the payroll period that contains March 12, firms that enter after that payroll period will appear in the LEHD but only appear in the LBD in the following year (if they survive). A firm may appear in the LEHD after it appears in the LBD for several reasons. First, firms only appear in the LEHD if they pay unemployment insurance taxes, which may not be relevant to all, especially younger, firms in the LBD. Second, because my LEHD sample contains a subsample of all states, it is possible for firms to appear in the LEHD, in my sample of states, after they appear in the LBD and in states outside my sample.

that the firm appears with employment in the LEHD (in my sample of states) as its entry year.⁷¹ Finally, while the firm identifiers are longitudinal, it is possible (but uncommon) for firm IDs to change over time. Because I am interested in new firms, rather than, e.g., firms that have changed ownership, I attempt to avoid misclassifying firm ID changes as new firms by ignoring in my definition of entrepreneurship below firms that are very large in their entry year,⁷² who I assume are less likely to be truly new firms.⁷³

Given a firm's entry year, I identify the "initial team" of the firm as the individuals with the three highest annual earnings in the firm in the entry year. Unless otherwise noted, I call an individual an **entrepreneur** in a given year if they are one of the top three highest paid employees of a firm and the year is the firm's entry year.⁷⁴

This notion of an entrepreneur is intended to capture an individual who most likely is integral to or closely witnesses the decision-making at a young firm, regardless of whether they are a legal owner or founder of the firm. There are two important aspects to consider for interpreting this definition. First, my definition of a firm's entry year marks the first year it has paid employees. Firms may have existed previously without employees, such that the entry year likely lags the initial planning and starting of a firm. Nonetheless, the transition to being a firm with paid employees is an extremely important step in a firm's life, particularly for firms that hope to grow.

Second, my definition *will not* pick up "owner-investors," who take their payoffs in the form of profit dividends rather than in wages (and thus would not appear in the LEHD). This is particularly relevant for sole proprietorships and partnerships, for which owners are not supposed to take wages, and thus should not appear in the LEHD (Hyatt, Murray, and Sandusky (2020)). I take any

⁷¹In order to avoid misclassifying old firms that are simply entering the sample of states in the LEHD as new firms, I ignore in my definition of entrepreneurship below any firm that appears in the LEHD strictly more than two years after its first year in the LBD.

⁷²I.e., firms whose entry year LEHD employment exceeds the 99th percentile of employment (slightly under 200 employees) for all entering firms.

⁷³An alternative method to determine a firm's entry year without the LBD is to use the firm age variable as listed in the LEHD (as described in Haltiwanger et al. (2014)). This variable is based on several sources, mostly the LBD and the National Employer Characteristics File (NECF), and is meant to provide age information for all firms in the LEHD (note that while the majority of the LEHD establishments can be mapped to the LBD, where firm age has been traditionally measured, this mapping is biased: smaller, younger firms are less likely to be matched). In untabulated results, I conduct a robustness analysis, defining entrepreneurship using the LEHD firm age variable, where I identify a firm's entry year by the year in which the firm is aged 0 (note that the Census zero-indexes age, while I one-index age); the results are virtually the same as my main extensive margin results: a one standard deviation (8.8 percentage points) increase in the share predicts a 0.22 percentage point higher likelihood of future entrepreneurship, 8.5% of the mean outcome.

⁷⁴Note that this firm need not be the entrepreneur's primary firm in the year and that not all firms have three entrepreneurs. For a more restricted definition, in untabulated results I consider only the top earner at new firms, which yields similar results: a one standard deviation (5.9 percentage point) in the share of coworkers who were recently the top earner at a new firm predicts a 0.13 percentage point higher likelihood of becoming a top earner at a new firm in the next five years, 9.13% of the mean outcome. In untabulated results, I similarly investigate and find qualitatively similar intensive margin results using this definition.

distinction between entrepreneurs, “owner-workers,” managers, “firm-runners,” etc. to be semantics alone; put differently, as discussed below, what matters for coworker learning is experience as part of a firm when the firm is very young, rather than strictly investment or idea-generation experience. I further conduct a robustness exercise by separately analyzing entrepreneurs at corporations, vs. those at sole proprietorships or partnerships, since the individuals I identify as entrepreneurs at corporations are more likely to be the true owners and founders of their companies.⁷⁵

Finally, note that for my analysis of spillovers, an individual is only identified as an entrepreneur in their firm’s entry year; they are also always considered a worker, regardless of their entrepreneur status.

Entrepreneurial outcome in the LEHD I measure absolute firm size in terms of employment and payroll from the LEHD, counting all individuals with employment at a firm in a year (i.e., not restricting to individuals for whom the firm is their primary firm). I also measure relative firm size by identifying firms whose LEHD employment or payroll falls in the top 10% among firms that enter in the same year and (6-digit NAICS) industry. Note that the thresholds determining which firms are in the top 10% of a given outcome are based on all firms that start in a given year, not restricting to firms started by individuals in my main reduced form sample; the thresholds are also calculated by weighting firms equally, rather than by weighting firms by the number of entrepreneurs (up to three). In practice, this means that more than 10% of previous entrepreneurs started firms with top 10%.

I measure firm survival and entrepreneur retention using the LEHD. I define a firm’s survival to a given firm age based on whether the firm has nonzero employment at that age and say that, e.g., a firm survives to age 2 if it employs workers in its second year. In this paper, I consider survival as a marker of success — more successful firms survive for more years; I abstract from the possibility of successful exits (e.g., mergers and acquisitions). I measure whether an entrepreneur is still employed at their entrepreneurial firm at a given firm age (regardless of whether the firm is their primary firm).

A.I.B Longitudinal Business Database (LBD)

I use the Longitudinal Business Database (LBD) to construct my definition of entrepreneurship, as described in Section I.B. The LBD’s coverage starts in 1976 and tracks all U.S. business establishments and firms with paid employees over time, including physical establishments in states not

⁷⁵In untabulated results, I estimate models in which I only consider each legal type, in turn. I still find a positive coefficient on the share of an individual’s coworkers who were recently entrepreneurs, if I restrict my definition of entrepreneurship (for both dependent and independent variables) to corporations. For corporations, I find that a one standard deviation (8.3 percentage points) increase in the share predicts a 0.12 percentage point higher likelihood of future (corporation) entrepreneurship, 5.7% of the mean outcome. (I also find positive coefficients when I restrict to other legal types.)

covered by the LEHD in early years.⁷⁶ I aggregate the LBD to the firm level.

A.I.C Annual Survey of Entrepreneurs (ASE)

The ASE collects information from firms' owners on a variety of outcomes which are useful for studying the mechanisms of entrepreneurial spillovers. This dataset is a firm-level survey based on a collaboration of the Census with the Ewing Marion Kauffman Foundation and the Minority Business Development Agency.⁷⁷⁷⁸ The ASE ran annually to collect 2014, 2015, and 2016 economic and demographic data on businesses and owners for a representative sample of non-farm businesses with paid employees and with receipts of at least \$1,000. I use information from the surveys' questions on reasons for owning a business.⁷⁹

A.I.D Compustat-SSEL Bridge (CSB)

The CSB identifies publicly-traded firms by linking firms in the Census data to Standard & Poor's Compustat database, by year (Tello-Trillo and Streiff (2020)). I use this information to investigate whether exposure to more entrepreneurial coworkers predicts future entrepreneurs' firms becoming publicly traded.

A.I.E Business Register (BR)

The BR provides information on the legal form of businesses, namely whether they are structured as corporations, sole proprietorships, partnerships, or other forms. I use this information to conduct heterogeneity by legal type, in part to help interpret my measure of entrepreneurship.⁸⁰

⁷⁶For details, see Jarmin and Miranda (2002).

⁷⁷For details, see Foster and Norman (2017) and <https://www.census.gov/programs-surveys/ase/about.html>.

⁷⁸This data is at the FIRMID-level.

⁷⁹See <https://www.census.gov/programs-surveys/ase/technical-documentation/questionnaires.2014.html> for the 2014 questionnaire.

⁸⁰For details, see <https://www.census.gov/econ/overview/mu0600.html>.