Locating Nowhere? Startups and Remote Work
Extended Abstract

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1 Motivation and Research Question

In the last few years, especially in the aftermath of the pandemic, the ability to work remotely has enabled the growth of a new kind of startup: a firm with no physical office presence, whose workers can live wherever they choose. Prominent examples of past and present startups that operate virtually include GitLab, Zapier, and Doist (Choudhury 2025). 16% of firms worldwide now operate virtually (Owl Labs 2026), and the share for startups is likely to be higher. Many such organizations used to have offices, but transitioned to operating virtually to access a broader pool of employees and to save on office costs. The aftermath of the pandemic has also seen a sustained surge in the number of new startups. Decker and Haltiwanger (2024) document that this surge has been concentrated among industries such as online retail and professional, scientific, and technical services, fields which were most amenable to remote work during the pandemic and which have been among the slowest to return to consistent in-person work. This surge in startup activity has been followed by a surge in new jobs created, illustrating the important role of remote work and new firms in the aggregate economy.

This paper examines the impact of operating virtually on existing startups' performance and on subsequent startup entry. I define virtual startups as those whose employees all work remotely and which have no physical office presence. Founders face a trade-off between operating a virtual firm and opening an office. On the one hand, remote work has generally been popular with employees (Bloom et al. 2024, Choudhury 2024), allowing them more schedules and the freedom to work from a location of their choice, while employers can benefit from access to a wider geographic pool of potential hires without the need to restrict their search to candidates who live nearby or are willing to relocate. Operating virtually can also remove a key barrier to startup growth and survival: the need to rent office space, which can be cost-prohibitive for young and capital-constrained firms. On the other hand, in-person work and face-to-face interaction between employees can facilitate greater agglomeration effects and more efficient knowledge transfer (Emanuel et al. 2023), and can provide better access to funding sources for startups in particular. Proximity to a talented pool of potential workers and venture capital funding has been a driving force in turning the Bay Area into

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a hub for new startups, for example. Naturally, the factors affecting the decision to locate virtually and its outcomes are expected to vary by startup industry and founder characteristics.

I study how transitioning to operating virtually affects startups' performance relative to new firms that maintain an office presence. Using U.S. Census Longitudinal Business Database (LBD) and Longitudinal Employer-Household Dynamics (LEHD) data and exploiting cross-industry and cross-city variation in the ability to work in person, I examine whether startups that operate virtually generate higher revenue, survive longer, grow faster, employ more workers, and become acquired at higher rates. I also study the entry of new virtual startups and examine how these startups fare compared with new startups with a physical office. In examining the mechanisms driving these results, I focus on one of the principal reasons given by founders for operating virtually: access to a geographically and demographically broader pool of employees (Choudhury 2025). With these results, I hope to shed light on which types of firms are most likely to benefit or suffer from operating virtually, with practical implications for founders faced with this decision and for policymakers considering the benefits and drawbacks of remote work. These results also have implications for the geographic distribution of entrepreneurial activity. While such activity has historically been highly concentrated (Moretti 2021), the rise of virtual startups and remote work has the potential to reverse some of this concentration, with founders and employees becoming more geographically distributed.

2 Related Literature and Contribution

My paper contributes to the literature studying the impact of remote work on employees and firms. Bloom et al. (2025), Bloom et al. (2024), Emanuel et al. (2023), Gibbs et al. (2023), and Choudhury et al. (2021) study the effects of the pandemic-induced surge in work-from-home arrangements on employee productivity, satisfaction, and retention. Most closely related is Gupta el al. (2025), who study the effects of remote work on hiring and retention rates at startups and larger firms employing large numbers of technology workers. I build on this literature by examining how the effects of remote work for individual employees translate to downstream firm outcomes such as revenue, survival, growth, and acquisition, with a focus on startups that operate fully virtually and employ the kind of work-from-anywhere policy studied by Choudhury et al. (2021). Whereas earlier work has looked at only a single firm or industry, or particular occupations, I leverage data the near-universe of startups to examine heterogeneity by industry, geography, and startup characteristics, and with data on employees, I study how new employees at startups that go virtual differ in demographic characteristics and experience both from earlier employees at those startups and from employees at startups that maintain a physical presence.

I also contribute to the literature on the determinants of entrepreneurial entry (Bernstein et al. 2024, Kerr and Nanda 2010, Alon et al. 2018, Karahan et al. 2019, and Barrios et al. 2024) and success (Choi et al. 2025, Azoulay et al. 2022, Kim 2022). Most closely related is Kwan et al. (2025), who study the transition of remote workers from established firms into entrepreneurship. I contribute to this literature by

examining the characteristics of new startups that emerge in the age of remote work, comparing the founder and employee characteristics and firm outcomes of new virtual startups with those of new startups that maintain an office. While earlier work has provided descriptive evidence that places and industries with more remote work have seen greater startup entry, to my knowledge there is no current work that examines entry of virtual startups or how these startups fare relative to new startups with a physical presence.

3 Data and Methods

I use data from the U.S. Census Bureau's Longitudinal Business Database (LBD) and Longitudinal Employer-Household Dynamics (LEHD) datasets. The LBD is a census of all firms in the U.S. with paid employees, allowing me to identify startups and track their headquarters locations, survival, revenue, and employment over time. The LEHD is a linked employer-employee dataset allowing me to examine the demographic characteristics of founders and their employees and to observe the addresses and wages of employees over time. These data include nearly all firms across all industries, from large tech startups to mom-and-pop retailers. These data allow for capturing heterogeneity across industries and geographic locations. The data run through 2024, allowing me to observe outcomes of firms for several years post-pandemic. I hold Special Sworn Status through the U.S. Census Bureau and have been using these data for other projects.

The firm-level outcomes of interest are revenue, survival, growth, acquisition, employee characteristics, and founder characteristics (when studying entry). I define startups as firms that are less than 10 years old as of the start of 2020. I identify founders in this dataset following Kerr and Kerr (2017) and identify acquisitions as changes in firm ownership. I do not directly observe whether a firm is operating virtually. Instead, I compute the distance between employees' addresses and the headquarters of the firm, and I define virtual firms as those with more than 80% of new employees (hired in the last year) living outside commuting distance from the firm in 2022. I test the sensitivity of my results to varying this threshold.

To determine the causal effect of operating virtually on startups' outcomes, I exploit the fact that the Covid-19 pandemic brought about far-reaching and heterogeneous increases in the level of remote work across firms. Specifically, the pandemic led to a sharp increase in the number of startups operating virtually. I estimate the following difference-in-differences specification:

$$Y_{it} = \beta * \text{Virtual}_i * \mathbb{1}(\text{Post}_t) + \alpha_i + \gamma_t + \epsilon_{it} \tag{1}$$

Here, Y_{it} is the outcome for startup i in month t, Virtual_i is an indicator equal to 1 if startup i is operating virtually as of 2022 and 0 otherwise, Post_t is an indicator equal to 1 after February 2020 and 0 otherwise, and α_i and γ_t are firm and month fixed effects respectively. To validate the parallel trends assumption on which identification relies, I estimate an event study which compares the outcomes of startups that operate virtually with the outcomes of startups that retain a physical presence, before and after the surge in remote

work during the pandemic.

Crucially, a startup's decision to switch from having a physical presence to operating virtually is not random, and so there is endogenous selection on unobservables into operating virtually. I address this challenge using an instrumental variables approach, with two instruments for the decision to operate virtually. The first instrument is the pre-pandemic measure of latent ability to work remotely computed by Dingel and Neiman (2020). This occupation-level score is based on the idea that before the pandemic, certain jobs could be done remotely with differing levels of success, and occupations' latent ability to be done remotely is predictive of whether they were actually done remotely during the pandemic (Mongey et al. 2021). Since individual-level occupations are not observable in the LEHD, I use the aggregate scores of latent ability for remote work at the industry and metropolitan statistical area (MSA) levels. I estimate the following first stage:

$$\text{Virtual}_i = \delta * \text{LatentRemote}_{j(i)} * \text{LatentRemote}_{c(i)} + u_i$$

Here, $\text{LatentRemote}_{j(i)}$ and $\text{LatentRemote}_{c(i)}$ are the aggregate latent remote ability scores at the industry j and MSA c levels respectively. I then use the predictions of startups' virtual status to estimate equation (1) in the second stage. For this instrument to be valid, it must be the case that industry- and MSA-level measures of remote work ability are correlated with firms' decision to go virtual, and that these measures do not affect firms' outcomes other than through the decision to go virtual.

There is a concern that because this instrument varies at the industry-by-MSA level and not at the firm level, it may affect competitor firms' decisions to go virtual as well, which could also affect the focal firm's outcomes. To address this concern, I use a second instrument: the pre-pandemic firm-level average distance between employees' home addresses and the firm headquarters, computed as of 2019. This approach follows Kwan et al. (2025) and relies on the idea that startups whose employees lived further away from the office, and therefore faced higher commuting costs before the pandemic, were more likely to go virtual during the pandemic and remain virtual afterwards. With this instrument, the first stage is

$$\text{Virtual}_i = \delta * \text{AvgDist}_i + u_i$$

Where AvgDist_i the average commuting distance of workers at firm i in 2019.

To explore the mechanisms for any differences in performance between virtual and non-virtual startups, I study a primary driver of the decision to operate virtually: access to a geographically and demographically broader pool of employees (Choudhury 2025). I replace the firm performance measures on the left-hand-side of equation (1) with various measures of employee characteristics. These include the share of employees living outside of large metropolitan areas, the share of employees who are female or underrepresented minorities, the average age and education level of employees, the share of employees who are immigrants, the share of employees with young children, and the average salaries of employees. Prior work has documented that female workers and workers with families have stronger preferences for remote work

(Banerjee et al. 2024), so I expect to find that going virtual allows startups to employ more women and parents of young children. I also expect to find that virtual startups' employees are more geographically dispersed and earn somewhat lower wages, consistent with the ideas that the ability to choose where to live is a non-pecuniary benefit that can compensate for lower wages, and that employees who live in lower cost of living areas are willing to accept lower pay. Taken together, these results would suggest that if virtual startups are more successful than non-virtual startups, it may be because they are able to access a broader pool of employees, and thus hire better talent. I similarly study how the effect of going virtual varies by industry, firm characteristics, and founder characteristics, shedding light on which kinds of startups might see the largest effects of operating virtually.

I complement this analysis of existing startups' transition to operating virtually by studying the entry of new virtual startups. Specifically, I implement a difference-in-differences instrumental variables approach that mirrors equation (1):

$$Y_{cjt} = \beta * \text{Remote}_{cj} * \mathbb{1}(\text{Post}_t) + \alpha_{cj} + \gamma_t + \epsilon_{cjt}$$
$$\text{Remote}_{cj} = \delta * \text{LatentRemote}_c * \text{LatentRemote}_j + u_{cj}$$

Here, Y_{cjt} is the share of new startups in industry j with founders living in MSA c founded in month t that are virtual at the time of founding. Remote_{cj} is the share of employees working in industry j living in MSA c who work remotely (as measured by the distance from their addresses to their firm headquarters) in 2022, and LatentRemote_c and LatentRemote_j are the Dingel and Neiman (2020) scores aggregated to the MSA and industry levels respectively. Then, conditional on entry in industry j in MSA c in month t, I compare the firm-level outcomes, employee characteristics, and founder characteristics for virtual and non-virtual new startups. While more descriptive, these results provide complementary evidence of the effect of operating virtually on startup performance, as well as whether new virtual and non-virtual startups differ in the kinds of employees they are hiring and whether the feasibility of entering virtually is enticing a broader geographic and demographic pool of entrepreneurs to start their own virtual firms.

4 Discussion

The rise of virtual startups has far-reaching implications for the future of entrepreneurship, and the results of this paper can shed light on how that future will unfold. If these startups are more successful than startups with an office presence, then we could see an increase in startup activity overall (since virtual startups are less costly to form) as well as more geographic diversity in where founders and their employees live. To the extent that the effect of operating virtually varies by industry or founder characteristics, these results can provide guidance to founders who are considering starting a virtual firm or taking their existing firm virtual, decisions that will shape the future of entrepreneurship.