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Micro VC

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Abstract

Using a large dataset of US investors and their portfolio startups, we analyze the phenomenon of micro VC investors, that is, VC firms managing funds smaller than \$50 million. We show that investments by micro VCs have increased at a much steeper rate than those by traditional VCs during 2010-2020. We find significant differences between micro and traditional VCs beyond fund size. Micro VCs invest in early-stage startups more than traditional VCs do. Despite the greater risk of such investments, micro VCs use staged financing less frequently than traditional VCs. Additionally, micro VCs invest in geographically closer startups but their investments span a larger set of industries than traditional VCs. Examining the implications for portfolio startups, we find that startups financed by micro VCs raise less capital than those funded by traditional VCs and are less likely to exit via IPO or acquisition. These results are more pronounced when micro VCs are led by former entrepreneurs and are, at least in part, ascribed to the more founder-friendly management style of micro VCs.

JEL Classification: G24, L26

Keywords: venture capital, early-stage investment, fund size, Performance

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Micro VC*

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Abstract

Using a large dataset of US investors and their portfolio startups, we analyze the phenomenon of micro VC investors, that is, VC firms managing funds smaller than \$50 million. We show that investments by micro VCs have increased at a much steeper rate than those by traditional VCs during 2010-2020. We find significant differences between micro and traditional VCs beyond fund size. Micro VCs invest in early-stage startups more than traditional VCs do. Despite the greater risk of such investments, micro VCs use staged financing less frequently than traditional VCs. Additionally, micro VCs invest in geographically closer startups but their investments span a larger set of industries than traditional VCs. Examining the implications for portfolio startups, we find that startups financed by micro VCs raise less capital than those funded by traditional VCs and are less likely to exit via IPO or acquisition. These results are more pronounced when micro VCs are led by former entrepreneurs and are, at least in part, ascribed to the more founder-friendly management style of micro VCs.

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1 Introduction

Historically, the venture capital (VC) industry has been dominated by a relatively stable set of specialized investors. Yet, in recent years, several cash-rich entities from outside the traditional VC industry have started looking for investment opportunities in the startup ecosystem (CB Insights, 2015). As a result, the whole VC industry has experienced a sizeable expansion: the amount of funds allocated to startups reached \$580 billion in 2021, twenty times the amount invested in 2002 (The Economist, 2021). Non-traditional VC investors have fueled the largest increase in VC financing, and now account for more than half of the global VC activity.

The literature on traditional VC investments is vast. Scholars have explored how VC firms select portfolio firms and how they structure their investments (Ewens et al., 2022, 2018; Kaplan and Strömberg, 2003; Tian, 2011) as well as how VC contributes to firm performance (Chemmanur et al., 2011; Conti and Graham, 2020; Dutta and Folta, 2016; Fitza et al., 2009). By contrast, we still know little about the investment strategies implemented by emerging, non-traditional, VC entities. Recent undertakings in this area include the analysis of business angels (Lerner et al., 2018), mutual funds (Chernenko et al., 2021; Kwon et al., 2020), and hedge funds (Aragon et al., 2018). We contribute to this literature by focusing on a novel and so far unexplored set of investors active in entrepreneurial financing: micro VCs, that is, VC firms that manage funds smaller than \$50 million.

The fundamental questions we ask in this paper are: i) Do micro VCs pursue different investment strategies than traditional VCs?, and ii) How do startups backed by micro VCs perform? To answer these research questions, we employ fine-grained data on US investors and their startups available from Crunchbase for the period 2000-2020, and complement these data with detailed investor- and founder-level information from LinkedIn. Our analysis indicates that the number of deals struck by micro VCs has increased at a much steeper rate than the number of deals by traditional VCs in recent years: the former has increased by 240% during the 2000-2020 period, whereas the latter has increased by 127%. These figures

underscore the importance of better understanding the phenomenon of micro VC.

We devote the first part of the empirical analysis to descriptively assessing the differences between micro VCs and traditional VCs. By applying text-analysis methods to investor descriptions available from Crunchbase, we begin by showing that micro VCs emphasize the role of founders significantly more than traditional VCs. This is especially true for micro VCs that are managed by former venture capitalists or entrepreneurs. Next, we investigate micro VCs' portfolio choices. Consistent with the emphasis they put on founders, we find that micro VCs - especially when led by former entrepreneurs - target significantly more early-stage ventures. As investing in such ventures is riskier than investing in later-stage firms due to informational asymmetries (Nanda and Rhodes-Kropf, 2013), this finding suggests that micro VCs have a greater appetite for risk than traditional VCs. Delving deeper into micro VCs' investment approach, we find that they invest a smaller number of rounds in their portfolio startups while committing more capital per round relative to traditional VCs. This evidence is in contrast with the standard prediction that investors resort to investment staging to mitigate the risk of investing into early-stage ventures (Gompers, 1995).

We successively ask whether micro VCs are more specialized investors, as their lower size may suggest. Our analysis indicates that micro VC investments span a wider set of industries as compared to traditional VCs. Here, again, there is heterogeneity whereby micro VCs led by partners with professional experience in established corporations behave more similarly to traditional VCs, whereas those led by former entrepreneurs hold the least concentrated portfolios across industries. These results are remarkable as they appear to be at odds with the existing view that smaller VC funds tend to make more concentrated investments across industries in order to channel their limited resources toward fields in which they have more expertise (Gompers et al., 2009). Whereas micro VCs invest across a wide set of industries, they appear to concentrate their investments in startups that are geographically close to their funds. Taken together, these results suggest that while micro VCs rely on local investment opportunities to cope with informational problems (Bernstein

et al., 2016), they trade geographical proximity with lesser industry specialization.

Having shown that micro VCs' investment style differs in meaningful ways from traditional VCs, we next examine the performance implications of micro VC financing for startups. Here, our main finding is that startups financed by micro VCs are less likely to exit via an acquisition or an initial public offering (IPO) relative to startups financed by traditional VCs. The performance gap between micro VCs and traditional VCs remains substantial even after micro VC investors have acquired experience through their previous deals. Hence, this evidence suggests that micro VCs do not underperform simply because they are less-experienced VCs.

One reason why micro VCs may underperform relative to traditional VCs is that the former select worse investments. We explore this possibility by estimating a within-startup model where we hold time-invariant startup characteristics constant. To address obvious omitted variable concerns, we saturate the model with a wide range of fixed effects pertaining to firm-round, industry-year, and region-year. The results show that, all else equal, firms backed by micro VCs are less able to raise financial capital and continue to be less likely to experience a successful exit relative to those backed by traditional VCs. These findings are especially marked for micro VCs led by former entrepreneurs.

Collectively, the evidence so far indicates that, while the selection of bad draws may play a role, the under-performance of startups backed by micro VCs is at least in part attributable to these investors' post-selection practices. To shed light on this aspect, in our last analysis, we focus on a specific VC practice that the literature has deemed fundamental for the professionalization of portfolio startups: the replacement of a founder CEO. Existing studies show that as startups move on in their life cycle, the contributions of their founders become relatively less relevant and, therefore, VCs tend to replace them (Conti and Graham, 2020; Hellmann and Puri, 2002; Wasserman, 2017). Our analysis indicates that micro VCs are more keen than traditional VCs to retain their founder as the CEO, suggesting that the professionalization effort of micro VCs is not as pronounced as that of traditional VCs.

The key takeaway of our study is that although micro VCs have become a key investor in

the startup ecosystem, they systematically under-perform traditional VCs, especially when managed by former entrepreneurs. Therefore, our findings urge founders to be cautious when they select investors as although micro VCs emphasize the importance of the founding team relatively to traditional VCs, they do not guarantee the same success rate. Lastly, our results counter against some of the existing studies demonstrating the existence of diseconomies of scale in the private equity industry (Lopez-de Silanes et al., 2015): in the context of VC, small size does not appear to pay off.

2 Data

Our dataset comprises information on the deals made by US micro VCs and traditional VCs in technology startups. These data are available from Crunchbase, a relatively new repository of startups and their investors that is increasingly used in academic research (Conti and Roche, 2021; Roche et al., 2020). Crunchbase records extensive information on the startups' financing rounds, participating investors, founding members, industry, and technologies. A substantial portion of the data is directly collected by Crunchbase staff, while the remaining share is crowdsourced and subsequently reviewed by Crunchbase.

We focus on startups founded from 2000 onward because the coverage of startups by Crunchbase has been validated to be most accurate in the more recent years (Wu, 2016). Moreover, we restrict the analysis to deals made in US startups because Crunchbase information is more precise for these companies. Finally, we limit the sample to companies that are at most ten years old by the time they raise their first financing round as older companies may not correspond to the standard definition of startups (Colombo and Shafi, 2016).

Because we are interested in comparing the investment strategies of micro VCs relative to traditional VCs, we retain those financing deals made by either a micro VC or a traditional VC.

To categorize investors into micro VCs and traditional VCs, we relied on the classification provided by Crunchbase, which we verified by employing secondary sources of information such as LinkedIn, investors' websites, and VentureXpert. Given that an investor in Crunchbase can

be assigned multiple labels, we define as micro VC any investor with a “micro_venture_capital” label. Thus, micro VCs can be investors whose unique label is “micro_venture_capital” (the majority of them), but also investors defined by combinations such as “accelerator, micro_venture_capital” and “family_investment_office, micro_vc”.¹ Instead, we classify as traditional VCs those firms labelled as “venture_capital” .

Our final dataset encompasses 102,534 deals made in 24,028 US startups by 4,811 investors. The number of deals made by micro VCs is 30,518, while the number of deals made by traditional VCs is 72,016.

Figure 1 reports the number of deals struck by micro and traditional VCs over time. As shown, the participation of micro VCs in startup deals has rapidly increased starting from 2010. During the 2010-2020 period, the number of deals by micro VCs increased by 240%. In contrast, the number of deals by traditional VC has increased by 127%. Table A1 shows the summary statistics on some of the key variables used in the analysis.

⟨ Insert Figure 1 about here ⟩

Figure 2 displays the distribution of deals by micro VCs and traditional VCs across industries. As shown, micro VCs are relatively more active in media and entertainment, while less active in the biotech industry.

⟨ Insert Figure 2 about here ⟩

To further explore the nature of micro VC, we collected detailed information on micro VCs’ top managers from LinkedIn. Building on this information, we categorize micro VCs according to whether individuals in the top management team - prior to joining a given micro VC - had spent the majority of their time as: i) founders, ii) traditional venture capitalists, iv) employees at large corporations, or v) other employees. As shown in Table 1, top managers at micro VCs have primarily accumulated experience by working for large corporations or traditional VCs. Yet, experience as former founders is also relevant.

¹The results of this paper are qualitatively invariant when we adopt a stricter criterion for identifying micro VCs and include in this category only those labeled as “micro_venture_capital”.

⟨ Insert Table 1 about here ⟩

3 How do micro VCs invest? Descriptive evidence

3.1 Focus on founders

We start by assessing the relevance that micro VCs and traditional VCs attribute to the founders of their portfolio startups. For this purpose, we collected information on the descriptions that micro VCs and traditional VCs posted on Crunchbase. This information is available for 73.4% of the investors. Using these investor-level data, we estimate a linear probability model in which the dependent variable is an indicator for whether the words "founder" or "entrepreneur" appear in the investor description. We control for the natural logarithm of the number of words used in an investor's description, and the year when the investor made its first deal.

As shown in Panel A of Figure 3, micro VCs are 7 percentage points more likely than traditional VCs to use the words "founder" or "entrepreneur" when describing their firms ($p < 0.01$). As reported in Panel B of Figure 3, the emphasis on founders is especially accentuated in the case of micro VCs led by former venture capitalists and entrepreneurs.

Overall, this evidence suggests that micro VCs place significantly more emphasis on founders relative to traditional VCs, especially when micro VCs are led by former entrepreneurs or former venture capitalists.

⟨ Insert Figure 3 about here ⟩

3.2 Portfolio startups' age and investor staging

The entrepreneurial finance literature has highlighted the risk of investing in early-stage startups as their technologies are intrinsically difficult to evaluate at such a stage. When VCs invest in these companies they often stage their investments to gather additional information as it becomes progressively available and so reduce risk (Gompers, 1995; Tian, 2011). Here, we explore whether there are differences between VCs and micro VCs relative to the age of the startups in which they invest and to investment staging decisions.

For this analysis, we employ investor-startup-level data and estimate a regression model for the natural logarithm of a startup’s age -measured in months- as a function of whether an investor is a micro VC or a traditional VC. We control for investment-year fixed effects. As shown in Panel A of Figure 5, micro VCs tend to invest in younger companies relative to traditional VCs. In Panel B, we explore heterogeneity among micro VC investors focusing on the professional background of the managers. The results show that micro VCs managed by former entrepreneurs invest in the youngest startups. Overall, these findings suggest that micro VCs help narrowing the funding gap for early-stage firms.

⟨ Insert Figure 4 about here ⟩

To examine investor propensity to stage financing, we consider all investor-startup pairs and count the number of times the former invested in the latter. We regress this variable over an indicator distinguishing whether an investor is a micro VC or a traditional VC. We include fixed effects for the year in which an investor invested for the first time in the startup. Panel A of Figure 5 shows that micro VCs make fewer rounds of investment in their startups relative to traditional VCs. Panel B further shows that the effect is mostly driven by micro VCs run by former founders, while micro VCs run by former venture capitalists behave more similarly to traditional VCs.

⟨ Insert Figure 5 about here ⟩

In unreported analyses, we found that micro VCs invest smaller amounts than traditional VCs in their portfolio startups: the average amount invested by micro VCs in a startup is one-third that of traditional VCs. This result is to be expected given that micro VCs manage smaller funds. Yet, the relevant question is whether micro VCs continue to invest less than traditional VCs once their investments are normalized by the size of the funds they manage.

To address this question, we regress the share of funds invested in a startup’s round as a function of whether the investor is a micro VC or a traditional VC, and add fixed effects for

the year in which a round was raised. Because we have information regarding the amount startups raise per round but not about the amount invested by each investor, we assume that each round-investor invests the same amount. The latter is computed as the total dollar amount raised by a startup in a given round divided by the number of investors. We normalize the computed amount by the total size of an investor’s fund. If an investor raises more than one fund, we sum the total funds’ amounts. Panel A of Figure 6 shows that, relative to traditional VCs, micro VCs commit a greater share of their fund(s) to each of their portfolio startups. Panel B shows that this behavior is especially common across micro VCs led by former founders. Collectively, the evidence from this section indicates that while micro VCs make riskier investments relative to traditional VCs, they are not as active in staging their capital infusion across multiple rounds.

⟨ Insert Figure 6 about here ⟩

3.3 Portfolio industry composition

Here, we examine how micro VCs compare to traditional VCs in terms of their portfolio industry composition. Gompers et al. (2009) have shown that VCs making specialized investments perform better than VCs whose portfolio spans several industries. While industry specialization is associated with better screening and monitoring, whether VCs hold a specialized industry portfolio ultimately depends on available opportunities.

To explore the possible differences between VCs and micro VCs, we compute an Herfindahl-Hirschman index (HHI) that measures the investors’ portfolio industry specialization. Crunchbase assigns, on average, three industry categories per startup. As the definition of industries in Crunchbase is very granular (there are 47 categories), we manually grouped them into 13 broader industry classes.² The HHI for each investor is then computed building on this classification. For our analysis to be meaningful, we only retained those investors that had concluded at least two deals.

²The utilized classes are: agriculture/forestry, business services, computer software, computer hardware, biotechnology, communications, energy, financial services, medical/health, internet, manufacturing, transportation, and consumer-related.

We regress the HHI on an indicator capturing whether an investor is a micro VC or a traditional VC (used as reference category). We control for the natural logarithm of the number of deals completed by each investor, and fixed effects for the year in which an investor’s first deal was concluded. As shown in Panel A of Figure 7, micro VCs are less specialized than traditional VCs (that is, their investments span a broader set of industries). Panel B reports that the effect is mostly driven by micro VCs run by former entrepreneurs, while micro VCs run by individuals with corporate experience are more similar to traditional VCs.

Overall, these results underscore important differences in portfolio industry choices between micro VC and traditional VC.

⟨ Insert Figure 7 about here ⟩

3.4 Investor geographic preferences

Geographically-distant startups are notoriously more difficult to screen and monitor (Bernstein et al., 2016; Sorenson and Stuart, 2001). Since micro VCs are smaller than traditional VCs, they may have fewer resources to screen and monitor their investments. As a result, they might invest in geographically closer startups relative to traditional VCs to compensate for their lack of resources.

To explore this conjecture, we estimate a regression model at the investor level where the dependent variable is the natural logarithm of one plus the distance in kilometers between the city where an investor is headquartered and the city where its portfolio startup is located. The regressor of interest is an indicator for whether an investor is a micro VC or a traditional VC (used as reference category). We add fixed effects for the year in which an investor made its first investment in the startup. Results reported in Panel A of Figure 8 show that micro VCs make more geographically proximate investments than traditional VCs. Yet, there is an important heterogeneity depending on the professional background of micro VCs. Panel B of Figure 8 shows that the micro VCs run by former founders have

similar geographical preferences as traditional VCs, whereas all other micro VC types invest in relatively closer startups. Taking together the findings on industry specialization and geography, the evidence suggests that micro VCs appear to trade geographical proximity with lesser industry specialization.

⟨ Insert Figure 8 about here ⟩

3.5 Portfolio startups' exits

We conclude this section by examining the likelihood that a startup experiences an acquisition or an IPO, both of which are considered successful exit events. For this purpose, we conduct the analysis at the investor-startup level and compute the share of portfolio startups that experienced either an IPO or an acquisition. The results in Figure 9 show that the share of successful investments is lower for micro VC investors than for traditional VCs. Differentiating between young and old investors, we find that the portfolio of old traditional VCs exhibits a higher share of successful exits than that of young traditional VCs. Yet, experience does not appear to be a consequential factor in explaining portfolio performance among micro VCs.

⟨ Insert Figure 9 about here ⟩

To sum up our descriptive findings, micro VC investments appear to differ in meaningful ways from those by traditional VCs. Relative to traditional VCs, micro VCs are more focused on entrepreneurs, specialize in early-stage investments and are less likely to stage their investments. Moreover, they invest in geographically close startups but across a wider range of industries. Not only micro VC investment choices differ from those of traditional VCs, but their portfolio startups experience different exit outcomes relative to startups financed by traditional VCs.

4 Portfolio startups’ outcomes: Selection or investor management style?

In this section, we assess whether the differential performance of startups funded by micro VCs and traditional VCs is solely driven by the fact that these entities invest in different types of companies or also by their management style. We begin by conducting a within-startup regression analysis, thus holding time-invariant startup characteristics constant, to assess whether there remain differences between micro and traditional VCs in their contributions to a startup’s success post-selection. We will then focus on startup professionalization as a potential mechanism at play.

4.1 Startup financing

To assess how the participation of certain investors relates to the financing amount a startup raises in a given round, we estimate the following regression:

$$Y_{i,r,s,k,t} = \alpha + \beta_1 \textit{AtleastoneMicroVC}_{ir} + \beta_2 \textit{AtleastoneVC}_{ir} + \phi_i + \rho_r + \delta_{st} + \lambda_{kt} + \varepsilon_{i,r,s,k,t}, \quad (1)$$

where $Y_{i,r,s,k}$ is the financing amount a startup i located in state s and developing technology k raises in round r . We restrict the analysis to startups that -as of October 2020- raised more than one round and at least one of the rounds from either micro VCs or traditional VCs. $\textit{AtleastoneMicroVC}_{ir}$ is an indicator that equals one if at least one of the participating investors in round r is a micro VC and zero otherwise. $\textit{AtleastoneVC}_{ir}$ is another indicator that takes value one if at least one participating investor in round r is a traditional VC. ϕ_i is startup i ’s fixed effect, ρ_r is a round fixed effect, δ_{st} is a state-by-year fixed effect, and λ_{kt} is a sector-by-year fixed effect. ϕ_i absorbs time-invariant differences across startups, including quality differences in startup technologies and founding team. ρ_r absorbs differences across funding rounds. δ_{st} controls for macro trends that may vary from a US state to another, while λ_{kt} accounts for technology shocks that may correlate with the participation of certain

investor typologies in a startup's round and the startup's financing amount raised.

The results are reported in Table 2. Standard errors are clustered at the startup level. As reported in column (1), the participation of micro VCs is associated with a 25% increase in a startup's round amount, while the participation of traditional VCs is associated with a 80% increase, all else equal. These two effects are statistically different with a p-value of 0.000.

In column (2), we distinguish between experienced and less experienced micro VCs to assess whether the difference between micro VCs and traditional VCs derives from the fact that micro VCs have less experience on average. We define as experienced micro VCs those investors that have concluded a number of deals above the median computed for traditional VCs. Less-experienced micro VCs are instead those that have concluded a number of deals equal to or below the median for traditional VCs. Remarkably, we find that the effects associated with both experienced and less-experienced micro VCs are similar and significantly smaller than those associated with traditional VCs. This result suggests that experience is not a consequential factor in explaining the difference between micro VC and traditional VC.

Finally, in column (3), we distinguish micro VCs according to the professional background of their top management. In particular, we distinguish those that are managed by former venture capitalists, entrepreneurs, employees at large corporations, and others. As shown, micro VCs run by former entrepreneurs provide the smallest contribution to a startup's round amount. Micro VCs run by former venture capitalists provide a larger contribution, although the effect of their participation remains significantly smaller relative to the effect of traditional VC participation.

The totality of our results suggest that -all else equal- micro VCs provide smaller funding amounts than traditional VCs. This difference is driven neither by experience differentials among VC types nor by fixed differences across investee startups and rounds.

⟨ Insert Table 2 about here ⟩

4.2 Startup exit events

We next examine portfolio startups' exit events. For this scope, we estimate the following equation:

$$Y_{i,t,s,k} = \alpha + \beta_1 CumMicroVC_{it} + \beta_2 CumVC_{it} + \beta_3 CumAngel_{it} \quad (2) \\ + \phi_i + \delta_{st} + \lambda_{kt} + \varepsilon_{i,t,s,k},$$

where $Y_{i,t,s,k}$ the cumulative likelihood that a startup i in state s and sector k experiences a successful exit (IPO or acquisition) by year t . $CumMicroVC_{it}$ is an indicator that takes value one starting from the year a startup receives funds from at least one micro VC, and zero otherwise. $CumVC_{it}$ is another indicator that takes value one starting from the year a startup receives funds from at least one traditional VC. As before, ϕ_i is startup i 's fixed effect, δ_{st} is a state-by-year fixed effect, while λ_{kt} is a sector-by-year fixed effect.

The results from estimating this equation are reported in Table 3. Standard errors are clustered by startup. In column (1), we show that micro VCs do not significantly contribute to a startup's exit event. On the contrary, having received traditional VC funds is associated with a 0.5 percentage points increase in the likelihood that a startup will have experienced an acquisition or an IPO by year t . The latter is a sizeable effect if one considers that the mean of the analyzed outcome is 0.027.

In column (2), we interact the cumulative participation of micro and traditional VCs with an indicator identifying later rounds. These are second rounds and above. As shown, while the contribution to a startup's success by micro and traditional VCs in the first round is similar, in later rounds the contribution by traditional VCs is significantly larger. Moreover, micro VCs participating in later rounds provide a negative contribution relative to micro VCs participating in a startup's first round.

⟨ Insert Table 3 about here ⟩

Moving on, we assess whether contributions to a startup's exit outcomes vary depending

on micro VC characteristics. In column (1) of Table 4, we begin by distinguishing experienced and less experienced micro VCs. Consistent with our earlier finding, experience does not appear to be a consequential factor in explaining the different contributions of micro and traditional VCs to a startup’s successful exit event.

In column (2), we distinguish the different types of micro VCs according to the professional background of their management team. Here, we show that micro VCs managed by former founders provide a negative contribution to a startup’s IPO or acquisition events. Moreover, the contribution of micro VCs managed by former founders to a startup’s liquidity event is significantly lower than that by micro VCs managed by former venture capitalists and the difference is significant at the 5% level.

⟨ Insert Table 4 about here ⟩

Taken together, these results suggest that the difference in performance between startups funded by micro VCs and those funded by traditional VCs is not solely driven by selection. Differences in management appear to play a role, which we explore in the next session.

4.3 Retaining a founder CEO

We analyze a specific VC practice that the literature has deemed fundamental for the professionalization of portfolio startups: the replacement of a founder CEO. Existing studies have shown that one of the fundamental contributions VCs offer to their portfolio startups is the upgrade of their management team by bringing in experienced CEOs (Conti and Graham, 2020; Hellmann and Puri, 2002; Wasserman, 2017).

In Table 5, we explore possible differences between micro VCs and traditional VCs relative to this practice. In particular we estimate the likelihood that a startup’s founder is the CEO as a function of: (1) whether a startup was funded by at least one micro VC and (2) whether it was funded by at least one traditional VC. We control for the age of a startup as of 2020 and for state and sector fixed effects.

As reported in column (1) micro VCs are 2.7 percentage points more likely to retain one of the founders as the CEO, while traditional VCs are 4.6 percentage points less likely.

While these findings are consistent with our earlier evidence that micro VCs place larger emphasis on the founders than traditional VCs, they also explain at least in part the smaller contribution micro VCs offer to a startup’s liquidity event relative to traditional VCs. In fact, the existing literature has shown that the replacement of a founder CEO is positively related to the performance of a startup (Conti and Graham, 2020).

To conclude the analysis, we distinguish in column (2) micro VCs by the professional background of their top management. In line with our earlier findings, we find that micro VCs led by former entrepreneurs are significantly more likely to retain one of the founders as the CEO relative to micro VCs led by former VCs. Yet, the latter are more likely to retain founders relative to traditional VCs.

⟨ Insert Table 5 about here ⟩

5 Conclusions

While the literature on traditional VC is vast, we still know little about emerging or non-traditional VC investors. We contribute to fill this gap by studying an unexplored financial arrangement called micro VC, that is, venture capital firms managing funds generally smaller than \$50 million.

Employing a large dataset of US investors and their portfolio startups, we show that investments by micro VCs have increased during the 2010-2020 period at a steeper rate than investments by traditional VCs, underscoring the increased importance of micro VCs as startup investors. Our analysis highlights important differences between micro VCs and traditional VCs, which go beyond differences in fund size. Relative to traditional VCs, micro VCs appear to be more focused on entrepreneurs and specialize in early-stage investments. Despite the fact that these investments are relatively riskier, micro VCs are less likely to stage their investments compared to traditional VCs. Finally, micro VC investments are more geographically concentrated than those of traditional VCs, but span a larger set of industries.

Examining the performance implications for portfolio startups, we show that ventures

backed by micro VCs are less likely to achieve an exit or an acquisition than startups backed by traditional VCs. This result is obtained by controlling for fixed differences across portfolio startups and, thus, it does not merely stem from the fact that micro VCs select worse investments than traditional VCs. The difference in performance outcomes between micro-VC-backed and VC-backed startups remains substantial even when we distinguish between more and less experienced micro VCs. This finding thus suggests that investor differential experience does not exhaust the difference between micro VCs and traditional VCs. The gap in portfolio startup performance is especially pronounced when micro VCs are led by former founders. Moreover, the gap is at least in part due to the different management style of micro VCs relative to traditional VCs. Indeed, when we examine a fundamental aspect of a VC's professionalization role -the replacement of a founder CEO-, we find that micro VCs are more keen than traditional VCs to retain one of the founder as the CEO.

Overall, these results suggest that the diseconomies of scale which are prevalent in the private equity industry do not apply to micro VC investments: despite their small size, micro VCs perform worse than traditional VC firms. Moreover, the emphasis on the founding team that micro VCs - especially those managed by former entrepreneurs - display is not conducive to better performance outcomes for startups.

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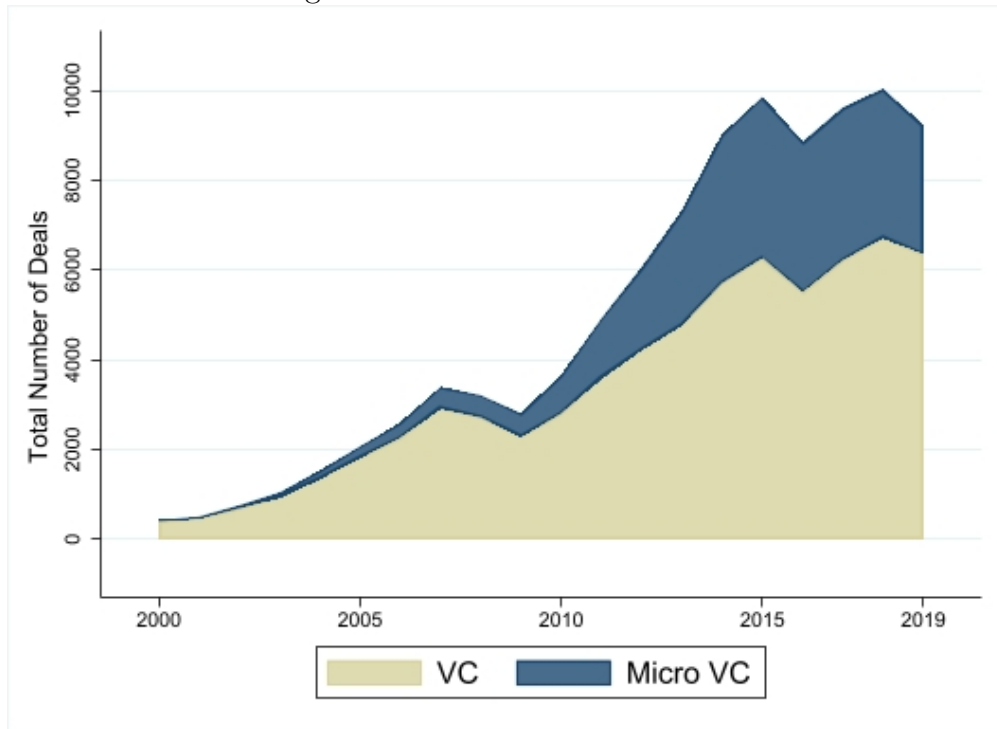
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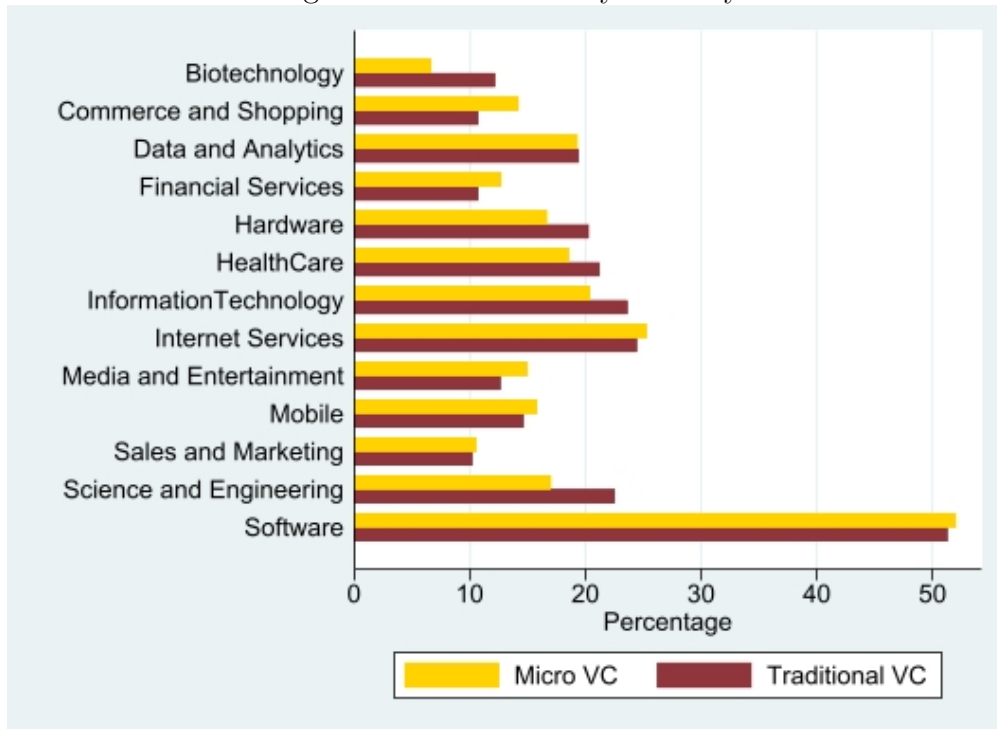
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Figure 1: Investor deals over time



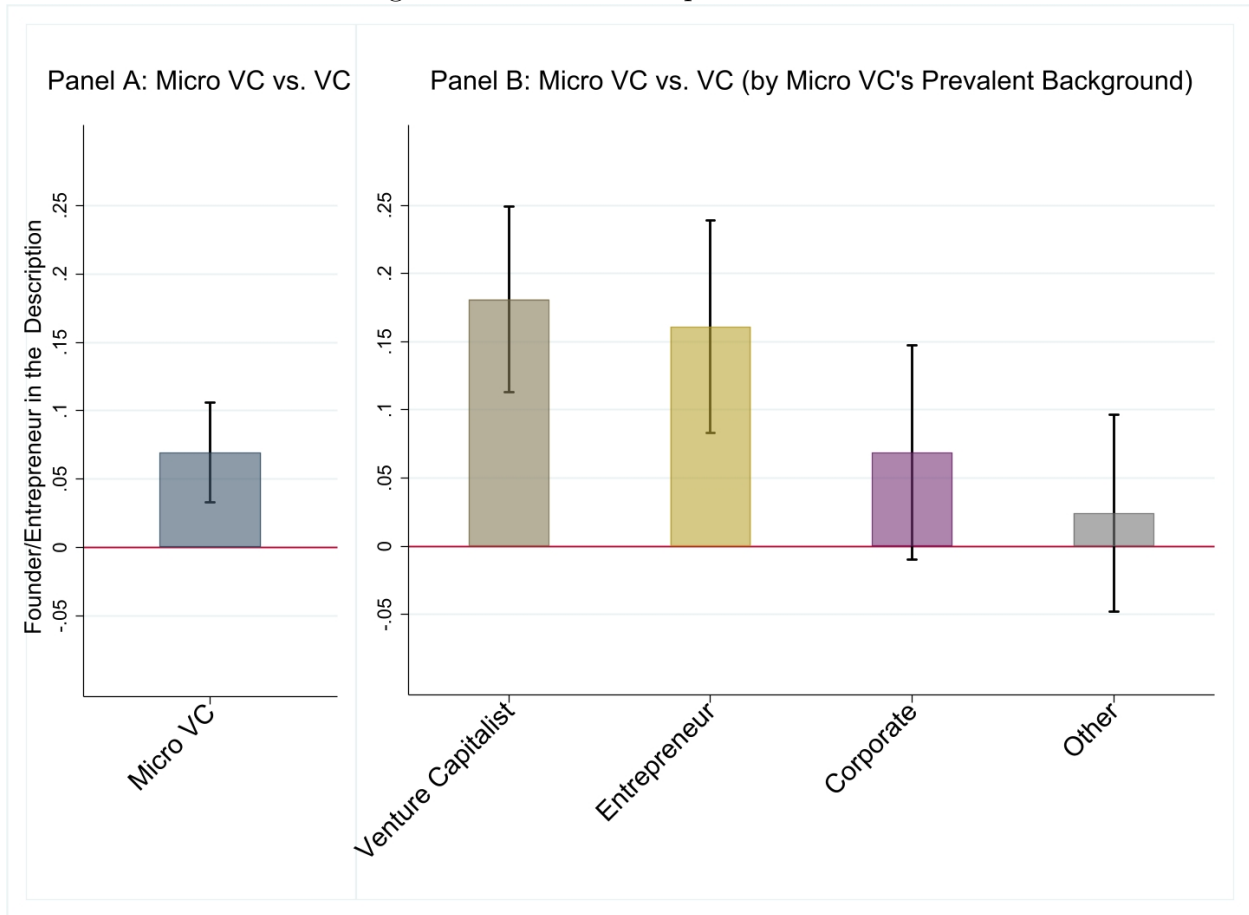
Notes: This figure shows the evolution of the number of US deals in which traditional VCs (gray) and micro VCs (blue) participated during the 2000-2019 period.

Figure 2: Investments by industry



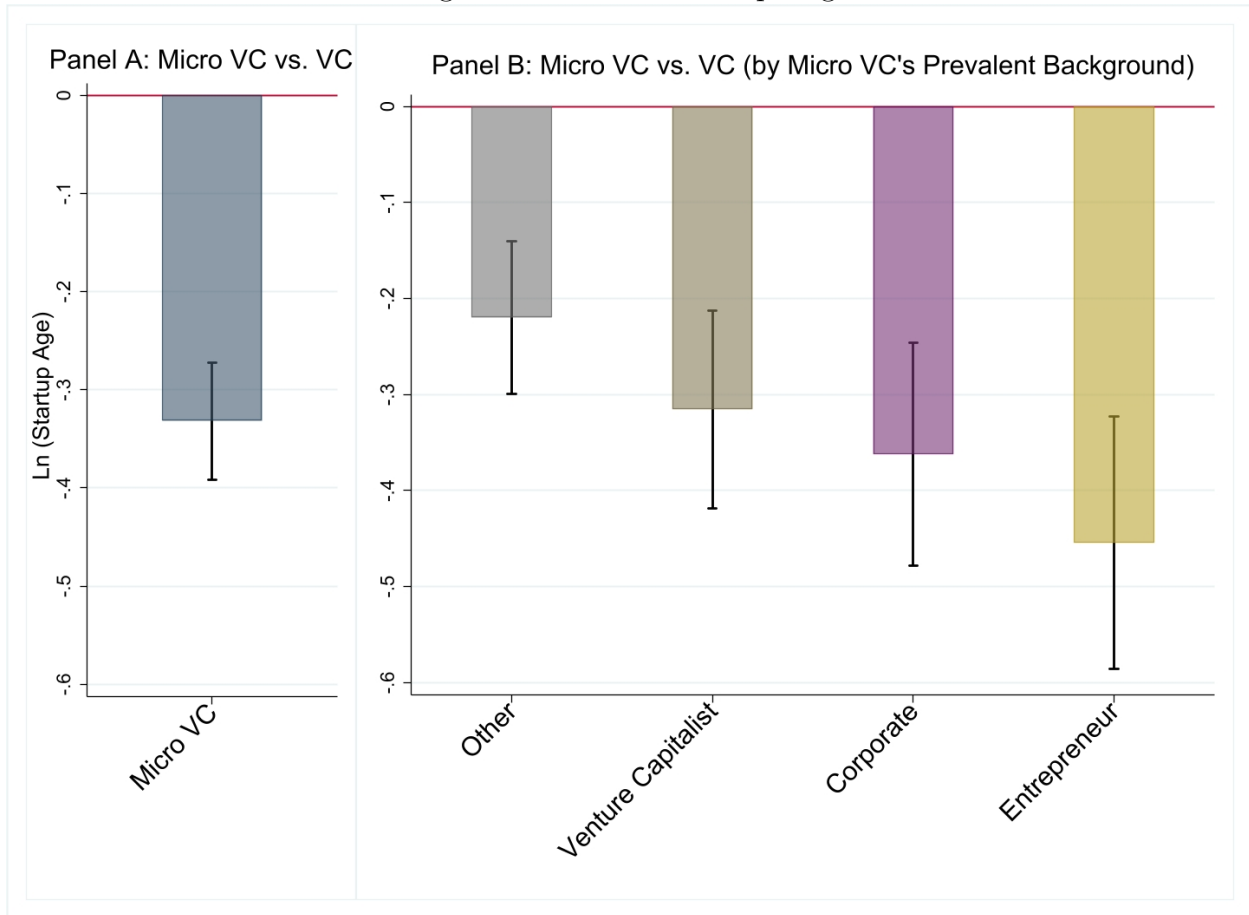
Notes: In this figure, we compare the propensity of micro and traditional VCs to invest in startups operating in the most common industries as reported by Crunchbase. The yellow bars represent the share of investments made by micro VCs in each of the industry category reported. The red bars represent the share of investments made by traditional VCs in each of the industry category reported. The sum of yellow or red bars can be greater than 100% because startups are assigned more than one industry group keyword in Crunchbase.

Figure 3: Investor entrepreneurial focus



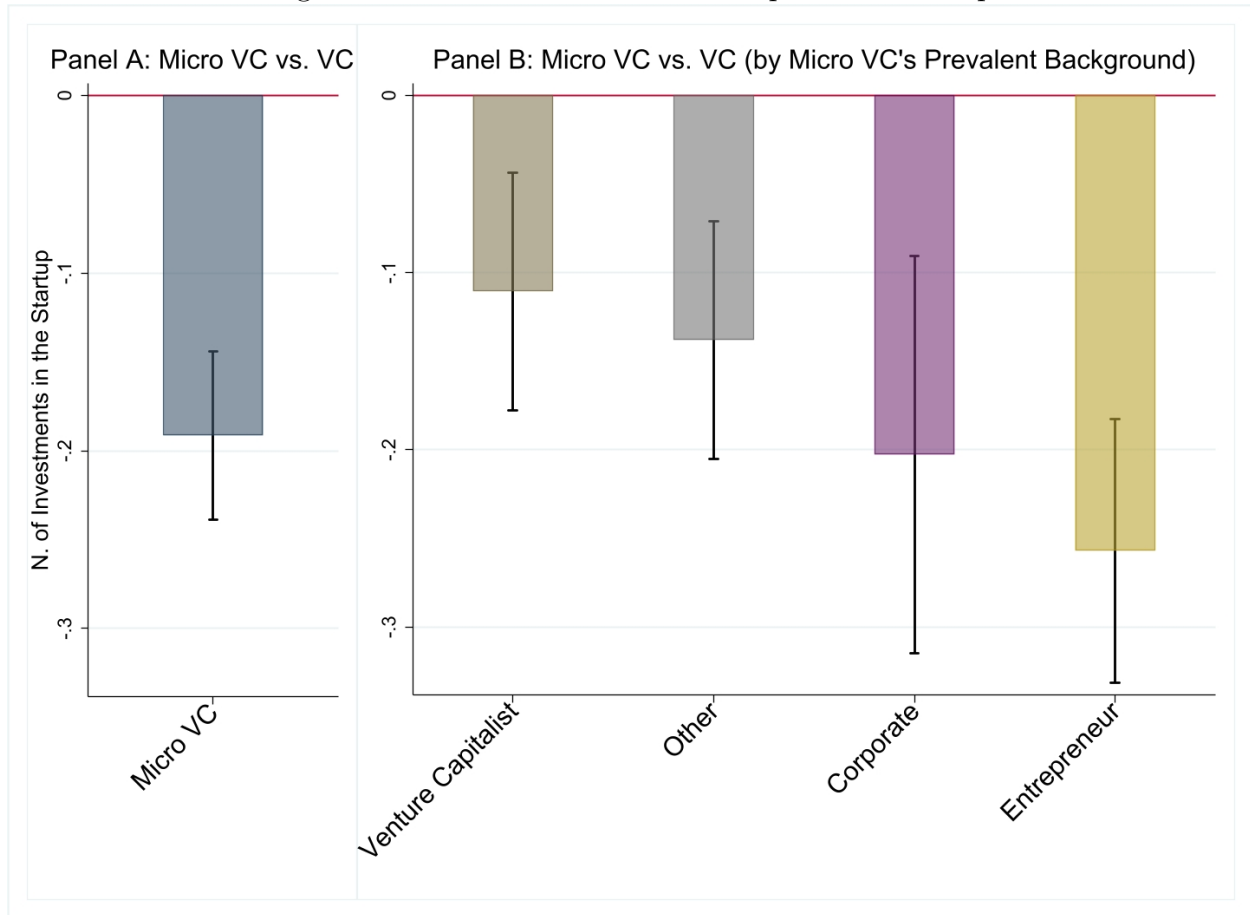
Notes: In Panel A, we assess whether Micro VCs are more likely to put more emphasis on the words "founder" and "entrepreneur" relative to traditional VCs. In Panel A, we estimate a regression model for whether an investor's description contains the words "founder" or "entrepreneur" as a function of whether an investor is a micro VC or a traditional VC, whereby the latter represents the reference category. In Panel B, we distinguish micro VCs according to whether they are led by former venture capitalists, founders, employees of large corporations, or others. The bars represent coefficient values, while the lines represent the 95th percent confidence intervals.

Figure 4: Portfolio startups' age



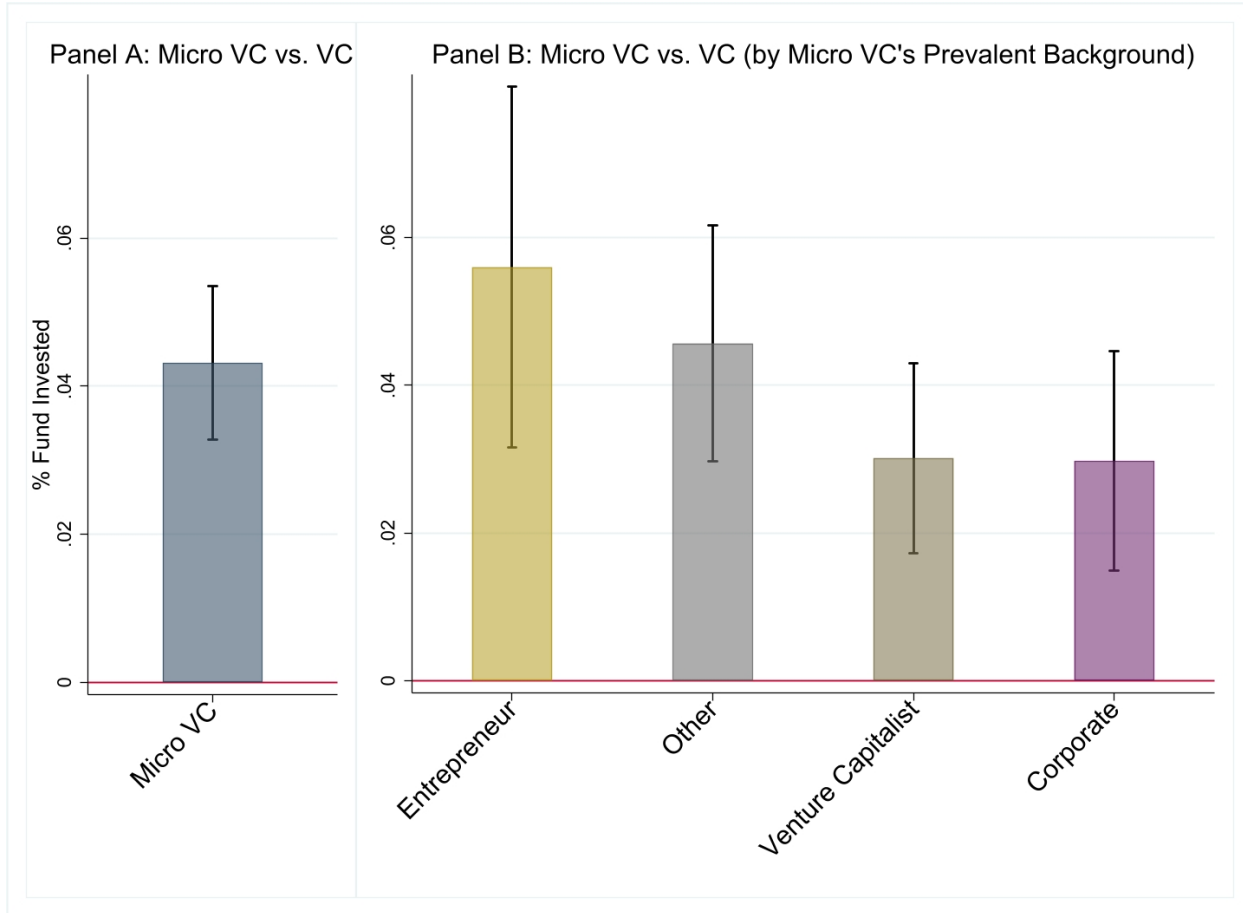
Notes: In Panel A, we assess whether Micro VCs are more likely to invest in younger startups. we employ investor-startup-level data and estimate a regression model for the natural logarithm of a startup's age -measured in months- as a function of whether an investor is a micro VC or a traditional VC (reference category). We control for investment-year fixed effects. In Panel B, we distinguish micro VCs according to whether they are led by former venture capitalists, founders, employees of large corporations, or others. Standard errors are clustered at the investor level. The bars represent coefficient values, while the lines represent the 95th percent confidence intervals.

Figure 5: N. investment rounds in a portfolio startup



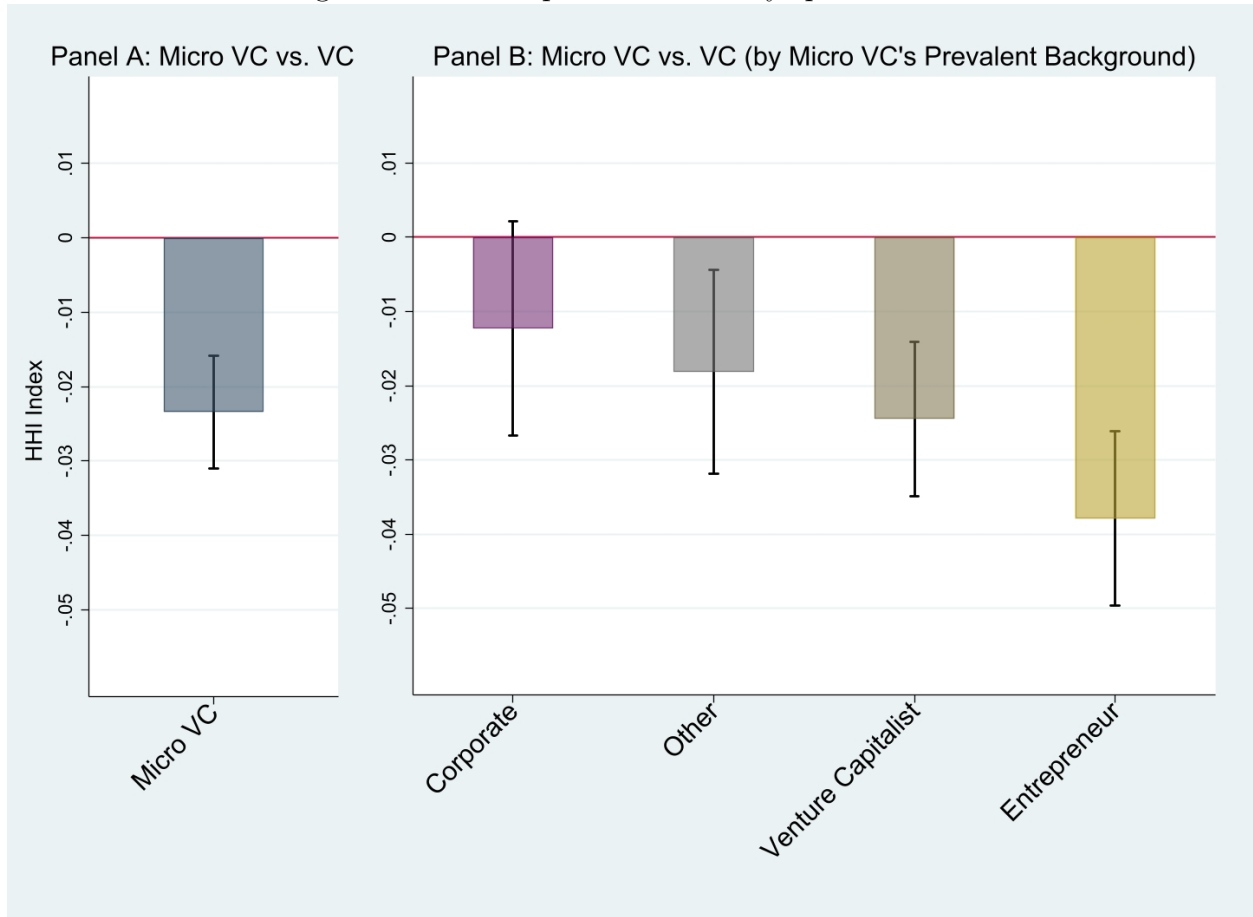
Notes: In Panel A, we examine micro VC and VC investment staging decisions. For this purpose, we consider all investor-startup pairs and count the number of times the former invested in the latter. We regress this variable over an indicator capturing whether an investors is a micro VC or a traditional VC. We include fixed effects for the year in which an investor invested for the first time in the startup. In Panel B, we distinguish micro VCs according to whether they are led by former venture capitalists, founders, employees of large corporations, or others. Standard errors are clustered at the investor level. The bars represent coefficient values, while the lines represent the 95th percent confidence intervals.

Figure 6: Percentage of investor funds' invested in portfolio startups



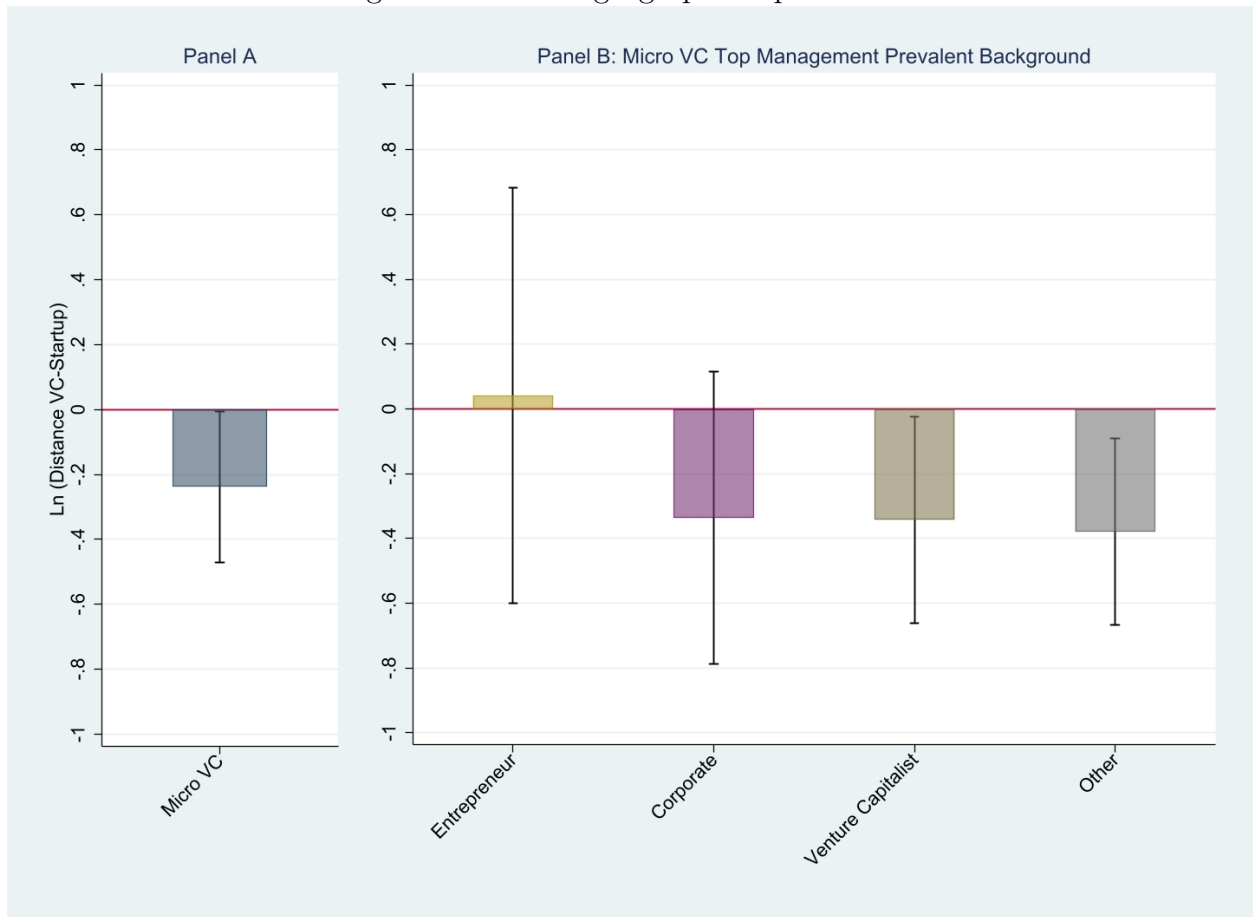
Notes: In Panel A, we assess the share of funds that micro and traditional VCs invest in each portfolio startup round. We regress the share of funds invested in a startup's round as a function of whether the investor is a micro VC or a traditional VC and add fixed effects for the year in which a round was raised. Because we have information regarding the amount startups raise per round but not about the amount invested by each investor, we assume that each round-investor invests the same amount. The latter is computed as the total dollar amount raised by a startup in a given round divided by the number of investors. We normalize the computed amount by the total size of an investor's fund. If an investor raises more than one fund, we sum the total funds' amounts. We exclude few observations where the percentage of the fund invested in a round is greater than one. We control for temporal trends through year dummies. In Panel B, we distinguish micro VCs according to whether they are led by former venture capitalists, founders, employees of large corporations, or others. Standard errors are clustered at the investor level. The bars represent coefficient values, while the lines represent the 95th percent confidence intervals.

Figure 7: Investor portfolio industry specialization



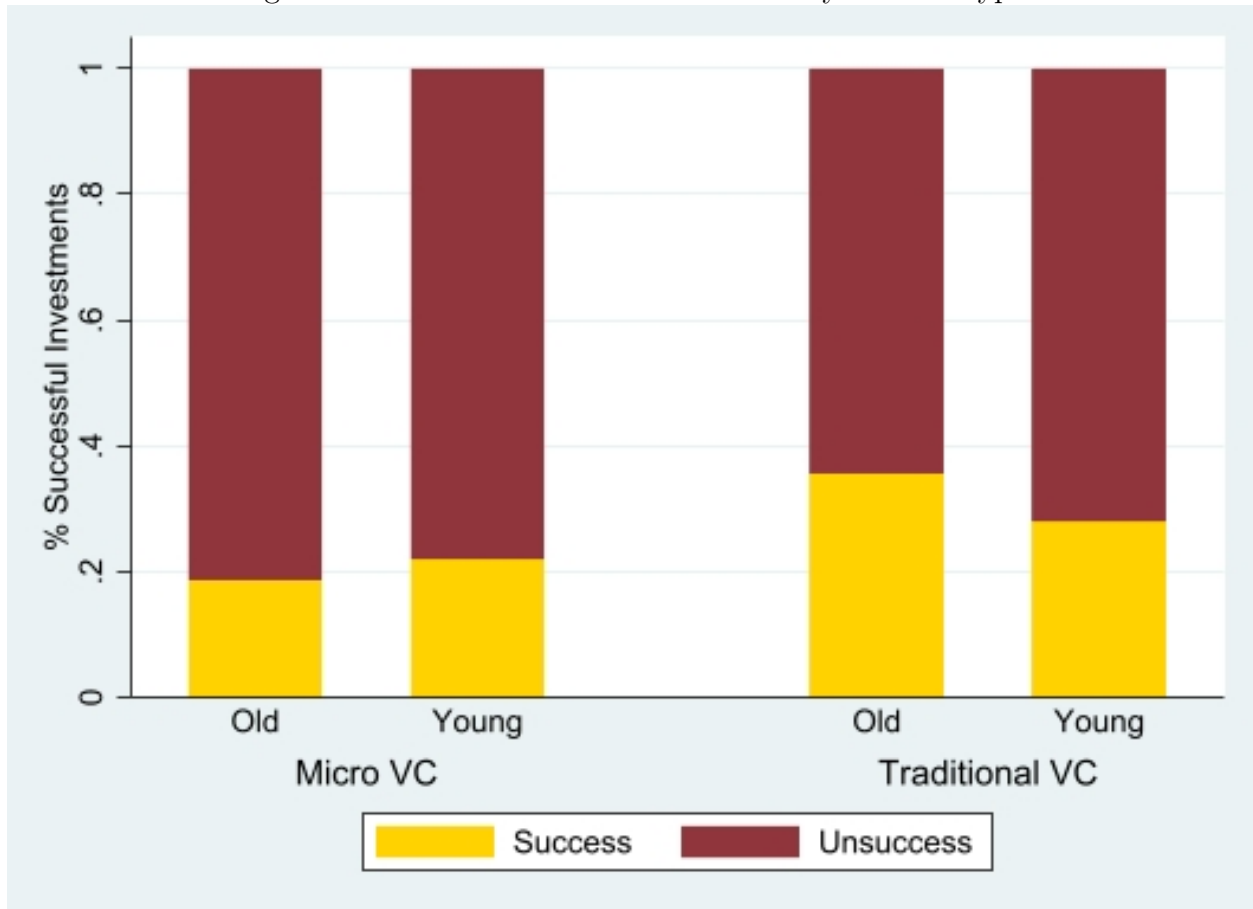
Notes: In Panel A, we assess the concentration of micro and traditional VCs across industries. The units of observation are the investors. For these VC investors, we compute an Herfindahl-Hirschman index (HHI) that measures their portfolio industry specialization. The industries considered are the ones to which the investors' portfolio startups belong. Crunchbase assigns, on average, two industry categories per startup. As the definition of industries in Crunchbase is very granular (there are 47 categories), we manually grouped them into the 15 broader industry classes reported in Table 3. The HHI for each investor is then computed building on this classification. For our analysis to be meaningful, we only retained those investors that had concluded at least two deals. We regress the computed HHI on an indicator capturing whether an investor is a micro VC or a traditional VC (used as reference category). We control for the natural logarithm of the number of deals completed by each investor, and fixed effects for the year in which an investor's first deal was concluded. In Panel B, we distinguish micro VCs according to whether they are led by former venture capitalists, founders, employees of large corporations, or others. The bars represent coefficient values, while the lines represent the 95th percent confidence intervals.

Figure 8: Investor geographical preferences



Notes: In Panel A, we estimate a regression model at the investor-startup level where the dependent variable is the natural logarithm of one plus the distance in kilometers between the city where an investor is headquartered and the city where its portfolio startup is located. The regressor of interest is an indicator for whether an investor is a micro VC or a traditional VC (used as reference category). We add fixed effects for the year in which an investor made its first investment in a startup. In Panel B we plot the estimated coefficients of the same regression when we replace the “Micro VC” dummy with the four dummies indicating the background of the top-management of the micro VC firm. Standard errors are clustered at the investor firm level. 95 percent confidence intervals are reported in black.

Figure 9: Share of successful investments by investor type



Notes: This figure displays the share of micro VC and traditional VC investments that resulted into either an IPO or an acquisition. We distinguish both micro VCs and traditional VCs by their age. Young investors are those established within the 0-5 age bracket, older investors are those with more than 5 years of age.

Table 1: Professional experience of micro VC top management

	N. Observations	% of Years
Corporate	819	27.379
Venture Capitalist	819	27.876
Entrepreneur	819	14.747
Other	819	29.998

Notes: This table summarizes the past employment experience of Micro VC top management. *Corporate* is the percentage of years the top management spent in large corporations. *VentureCapitalist* is the percentage of years the top management spent in VC firms. *Entrepreneur* is the percentage of years spent in startups as founders. *Other* is the percentage of years spent in other employment categories (e.g. small firms, public sector, universities, etc.).

Table 2: Per-round amount raised by portfolio startups

	(1)	(2)	(3)
	Ln(Amount Raised in the Round)		
At least one Micro VC in round t	0.247*** (0.019)		
At least one High-Exp. Micro VC in round t		0.208*** (0.019)	
At least one Low-Exp. Micro VC in round t		0.218*** (0.021)	
At least one Micro VC in round t : Entrepreneur			0.162*** (0.034)
At least one Micro VC in round t : Venture Capitalist			0.321*** (0.029)
At least one Micro VC in round t : Corporate			0.274*** (0.029)
At least one Micro VC in round t : Other			0.390*** (0.035)
At least one VC in round t	0.800*** (0.020)	0.795*** (0.020)	0.518*** (0.017)
Startup FE	Y	Y	Y
Round FE	Y	Y	Y
State x Year FE	Y	Y	Y
Sector x Year FE	Y	Y	Y
Observations	37,996	37,996	36,144
R2	0.824	0.824	0.825

Notes: Column (1) reports the results for the funding amount raised in a given round. Here, we condition the analysis to startups that raised more than one financing round. In column 1, the regressors of interest are: an indicator that equals 1 if the startup attracted funds from at least one Micro VC in the focal round (At least one Micro VC in round t) and an indicator that equals 1 if startup attracted funds from at least one VC in the focal round (At least one VC in round t). In column (2), we distinguish between experienced (At least one High-Exp. Micro VC in round t) and non-experienced micro VCs (At least one Low-Exp. Micro VC in round t). We consider as experienced micro VCs, those micro VCs whose number of rounds in which they had invested is greater than the median number for traditional VCs. In column (3), we distinguish Micro VCs according to the past work experience of their top management. The regressors of interest are: a (0/1) indicator that equals one if a micro VC financing startup i in round r is led by former entrepreneurs (At least one Micro VC in round t : Entrepreneur); a (0/1) indicator that equals one if a micro VC financing startup i in round r is led by former venture capitalists (At least one Micro VC in round t : Venture Capitalist); a (0/1) indicator that equals one if a micro VC financing startup i in round r is led by managers with corporate experience (At least one Micro VC in round t : Corporate); a (0/1) indicator that equals one if a micro VC financing startup i in round r is led by managers with other experience (At least one Micro VC in round t : Other). Standard errors - reported in parentheses - are clustered at the startup level. Significance noted as: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 3: Startup exit events

	(1)	(2)
	IPO/Acquisition	
Cum. Micro VC (0/1)	0.001 (0.002)	0.005** (0.002)
Cum. VC (0/1)	0.005*** (0.002)	0.004** (0.002)
Cum. Micro VC (0/1) \times Late round		-0.007*** (0.003)
Cum. VC (0/1) \times Late round		0.005* (0.003)
Startup FE	Y	Y
Round FE	Y	Y
State x Year FE	Y	Y
Sector x Year FE	Y	Y
Observations	172,808	172,808
R2	0.212	0.212

Notes: Column (1) reports the results for the cumulative likelihood that a startup experiences either an IPO or an acquisition by year t . The dependent variable (IPO/Acquisition) has value one in the year in which the startup went public or was acquired and 0 before such events. We truncate the sample after startups experience a liquidity event. The regressors of interest are: a (0/1) indicator that takes value 1 starting from the year in which a startup attracts micro VC funds (Cum. Micro VC); and a (0/1) indicator that takes value 1 starting from the year in which a startup attracts VC funds (Cum. VC). Column (2) reports the results having interacted each of the above regressors with a (0/1) indicator that takes value 1 starting from the year in which the startup received its second VC funding round. Standard errors - reported in parentheses - are clustered at the startup level. Significance noted as: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 4: Startup exit events - Distinguishing Micro VCs

	(1)	(2)
	IPO/Acquisition	
Cum. High-Exp. Micro VC (0/1)	0.001 (0.002)	
Cum. Low-Exp. Micro VC (0/1)	0.002 (0.002)	
Cum. Micro VC: Entrepreneur (0/1)		-0.005* (0.003)
Cum. Micro VC: Venture Capitalist (0/1)		0.002 (0.003)
Cum. Micro VC: Corporate (0/1)		0.002 (0.003)
Cum. Micro VC: Other (0/1)		-0.002 (0.003)
Cum. VC (0/1)	0.005*** (0.002)	0.003* (0.002)
Startup FE	Y	Y
Round FE	Y	Y
State x Year FE	Y	Y
Sector x Year FE	Y	Y
Observations	172,808	158,231
R2	0.212	0.213

Notes: Column (1) reports the results for the cumulative likelihood that a startup experiences either an IPO or an acquisition by year t . The dependent variable (IPO/Acquisition) has value one in the year in which the startup went public or was acquired and 0 before such events. We truncate the sample after startups experience a liquidity event. In column 1, the regressors of interest are: a (0/1) indicator that takes value 1 starting from the year in which a startup attracts funds from experienced Micro VCs (Cum. High-Exp. Micro VC); a (0/1) indicator that takes value 1 starting from the year in which a startup attracts funds from less experienced Micro VCs (Cum. Low-Exp. Micro VC); and a (0/1) indicator that takes value 1 starting from the year in which a startup attracts VC funds (Cum. VC). In column (2), we distinguish micro VCs by the professional experience of their top team. If there is more than one micro VC investing in a startup, we compute the average percentage of years spent in each of the four employment categories considered by all the top teams of the two micro VCs. Standard errors - reported in parentheses - are clustered at the startup level. Significance noted as: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 5: Founder CEO turnover

	(1)	(2)
	Founder is CEO	
At least one Micro VC	0.027*** (0.008)	
At least one Micro VC - Entrepreneur		0.046*** (0.011)
At least one Micro VC – Venture Capitalist		0.021* (0.011)
At least one Micro VC - Corporate		0.028** (0.011)
At least one Micro VC - Other		0.025** (0.012)
At least one Traditional VC	-0.046*** (0.009)	-0.034*** (0.009)
Ln(Age)	-0.198*** (0.008)	-0.199*** (0.008)
State FE	Y	Y
Sector FE	Y	Y
Observations	10711	10021
R2	0.106	0.106

Notes: We examine the likelihood that an investor retains one of the founders as the CEO. We restrict the sample to startups for which Crunchbase reports both founder and CEO information. The dependent variable “Founder is CEO” is a (0/1) indicator that takes value 1 if a founder is also the CEO. In column (1), the regressors of interest are: a (0/1) indicator that equals 1 if a startup was funded by at least one micro VC (At least one Micro VC); a (0/1) indicator that equals 1 if a startup was funded by at least one traditional VC (At least one Traditional VC). In column (2), we distinguish micro VCs by the background of their management. In all specifications we control for the natural logarithm of one plus the age of a startup in 2020. Robust standard errors are reported in parentheses. Significance noted as: *p<0.10; **p<0.05; ***p<0.01.

Table A1: Descriptive statistics

Panel A: Deals	Micro VCs		Traditional VCs		Diff.
	Mean	s.d.	Mean	s.d.	
Ln (Startup Age)	3.205	0.005	3.518	0.003	-0.313***
% Fund Invested Deal	0.054	0.001	0.011	0.000	0.044***
Ln (Distance VC-Startup)	4.525	0.022	4.809	0.014	-0.284***
Panel B: Round	Micro VCs		Traditional VCs		Diff.
	Mean	s.d.	Mean	s.d.	
Ln (\$ Raised Round)	14.860	0.013	15.744	0.010	-0.884***
Panel C: Startup	At least one micro VC		Traditional VC only		Diff.
	Mean	s.d.	Mean	s.d.	
IPO/Acquisition	0.199	0.003	0.277	0.004	-0.078***
Founder is CEO	0.847	0.004	0.771	0.007	0.085***

Notes: Descriptive statistics in Panel A are at the deal level. Descriptive statistics in Panel B are at the round level. Descriptive statistics in Panel C are at the startup level. Significance noted as: *p<0.10; **p<0.05; ***p<0.01.