Alumni Networks in Venture Capital Financing

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Abstract

One-third of startup deals involve a founder and investor from the same university. Venture capitalists (VCs) are more likely to invest in, and place larger bets on, alumni from their alma mater. These deals are then more likely to IPO, post-funding. Using VC partner turnover, we show a causal link between education ties and funding likelihood. Importantly, startups on the *margin*, whose founders share an alma mater with a VC partner, also have better post-funding outcomes in instrumental variables tests using the supply of funding to a sector as an instrument. Our results imply that university connections facilitate information flow rather than diverting funds towards lower-quality startups.

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I. Introduction

Venture capital funding is considered the lifeblood of entrepreneurial endeavors. VC-backed startups account for an outsized share of innovation (Kaplan and Lerner (2010), Gornall and Strebulaev (2021)) and almost half of all the US IPOs (The National Venture Capital Association, 2020). Yet, despite the importance of innovation for economic growth, many founders of early-stage startups struggle to obtain financing due to severe information frictions between startups and venture capitalists. In this paper, we show that shared professional networks created by university attendance help reduce these information asymmetries, facilitating early-stage investment as well as entrepreneurial success.

We start by documenting the striking fact that one in three deals in the venture capital market involves a startup founder and a VC partner with a shared alma mater. We show that this is driven by venture capital investors tilting their portfolios toward startups from their alma mater, rather than by factors such as co-location or top schools' tendencies to produce both entrepreneurs and VC investors. We then confirm that this preference reflects an information advantage, as opposed to investors' favoritism toward startups from their alma mater, by showing connected investments have better post-funding exit outcomes. Finally, we underline the information-advantage result by showing that it persists even among marginal deals - not just the average one. Overall, our findings illustrate that alumni networks are a major force shaping venture capital investment and the U.S. entrepreneurial landscape.

Historically, empirical examination of the influence of education networks on early-stage financing has been impeded by two main factors: data limitations and identification challenges. We circumvent the traditional data limitations by using expansive new data from PitchBook on startup founders and VC partners, including their education backgrounds.[1] We further supplement these data with measures of education quality, based on standardized test scores of incoming undergraduates and

[1] PitchBook provides the most comprehensive data available on entrepreneurial financing. We discuss the advantages of PitchBook relative to Crunchbase and VentureXpert in Appendix A.

(separately) the average early-career pay of alumni. Combined, our data allow us to credibly identify common (i.e., shared) college alumni status between founders and investors, while controlling for school quality, which allows us to hold top schools' tendencies to produce both entrepreneurs and VC investors fixed.

The identification challenge stems from unobservables. For example, in our first tests we explore the influence of shared alma mater on whether an entrepreneur obtains VC funding or not (the extensive margin). But the observed dyads of startups with VCs don't necessarily reflect choices from amongst an otherwise random set of plausible pairings, unless we develop defensible counterfactuals. We therefore build our counterfactuals to reflect known predilections of VC investors.

Specifically, we rely on the rich nature of our PitchBook data with more complete coverage of companies and deals. Investors see many more deals than they take. We know that they tend to consider deals from certain industries and geographies (Gompers et al. (2020)). Therefore, we define a VC investor's consideration set [i.e. counterfactuals] as any deals that occurred in the same state-industry-year-deal stage as the deal that the focal investor actually participated in. In other words, if *this* (focal) investor chooses not to make a deal, but another investor does so in that same state and year and industry and financing stage, then it is likely the focal (i.e. non-investing) financier at least considered it. The counterfactual set is thus well-populated and based on known opportunities of early-stage investors.

Our extensive margin test is then a simple linear probability model. The query is whether a VC investor's choice between the focal deal and counterfactuals is influenced by presence or absence of shared alma mater between the investor and founder. We find that it is: the effect of same-alma-mater is to raise deal likelihood by 0.22 percentage points. Given an average probability of investment occurrence of 2% (in our panel), the incremental benefit of shared alumni status is roughly 10%. While this is not necessarily a clear causal effect, it strongly suggests alumni connections matter to VC financing of early stage companies.[2]

We next offer a shock-based view of the role of alumni connections on deal likelihood, by exploring VC partner departures. When a partner leaves an investment firm,[3] this potentially removes same-alma-mater connectivity with startups that the firm may consider funding. We present two pieces of evidence from this setting, that suggest a causal link between alumni connections and deal consummation.

First, partner departures associate with a steep drop in the proportion of deals at a VC that go to founders from the departing-partner's alma mater. This does not present prior to departure; in fact the pre-departure presence of that partner on average increases deal likelihood. This suggests the departure causes the drop, as long as the departure is largely exogenous. Our second piece of evidence supports the exogeneity argument. Deals going to founders who attended the same university as the departing partner, on average do not decline, when measured across all VCs (not just the one the partner departed from). In other words, there is no apparent decline in quality of founders or their deals, as other VCs are equally willing to fund them after vs. before the event.

Our final extensive margin analysis addresses one potential issue with our first result; that the counterfactual deals a VC might consider investing in (besides the focal deal that they actually made), were drawn from realized deals done by other VCs. The concern is that consummated deals may differ from potential deals that never happen, implying a potential unobservable difference in quality that simultaneously explains the lack of alumni connection and lack of deal.

To address this concern, we revisit the completeness of PitchBook's data on startups. Many of those startups do not receive VC funding. This allows us to again run a simple LPM and construct a dependent variable as simply whether a startup gains funding - within a reasonable time period after founding[4] - or not. We explain this probability with the proportion deals made by VC partners in the focal (potential) deal's sector, in the

[2] It is also worth noting that cross-sectional variation in this effect - discussed in the results section - supports an information-benefit interpretation to alumni connections.

[3] An event that is likely exogenous to investment past performance according to Ivashina and Lerner (2019)

[4] We define and discuss the time-window in section III.A.3

year of focal startup founding, that attended the same university as the founder. The relationship is positive. In other words, when the fraction of VCs that do deals in this sector (recently) is more "from" the same alma mater, the focal startup is more likely to get funded. Overall, our multiple pieces of evidence strongly support an alumni-connection benefit to a startup obtaining financing.

To lend credence to the value proposition of alumni connections, we also study the intensive margin, specifically the quantity of funding raised. Here too, alumni connections matter. When an investor and founder share an alma mater, the investment amount is 18% larger on average. Thus it appears unlikely that the connection merely facilitated a favor, but rather that the investor is willing to backstop with more funding compared to unconnected investments. This positive influence of alumni connection on funding amount importantly survives *school* fixed effects (which we discuss in more detail later).

While our results describe a positive influence of shared educational background on funding likelihood and amount, the efficiency of such relationships is still unclear. If connections through educational networks help resolve information asymmetry between founders and investors, then connections can improve investment decisions. On the other hand, if the investment patterns we document are driven by favoritism or homophily (a "taste" for founders from the same alma mater), then investment outcomes may be worse. We explore this tension by testing whether investors' connected investments perform better or worse than their non-connected investments in the same state-industry-year. We find they perform better.

First we find that VCs' connected investments are 33% more likely to lead to an IPO post-funding.[5] Second, we provide evidence that this improvement even presents among marginal deals using a Becker-style outcome test. For this test we use an instrument to identify "marginal" deals that reflects a surfeit of VC funding in the same sector as the focal deal. In the first stage this IV strongly explains the focal deal's funding amount, while the second stage (using the outcome from the first stage) positively associates with

[5] We also find some weak evidence that M&A outcomes are facilitated by alumni connections.

post-funding IPO likelihood.[6] Crucially though, the coefficient on the funding amount instrument in the second stage (explaining IPO likelihood) is significantly more positive when the deal was same-alma-mater, than when it was not. In other words, shared alma mater associates with better outcomes even among marginal deals, strongly suggesting an information benefit story. If shared alumni status was driving marginal deals due to homophily or favoritism, the outcomes should be *worse*.

Overall, our results show that early-stage investors tilt their portfolios toward entrepreneurs from their alma mater, and that these bets pay off better. This is new and valuable information regarding the efficient allocation of capital in the early-stage-financing landscape. Crucially, these findings are incremental to known determinants of entrepreneurial fundraising. In particular, we control for the commonly known determinants of early-stage financing: distance between entrepreneur and investor, firm age, founder's university's size, its academic quality, and its number of alumni that are early-stage investors.[7] We find that none of these factors absorb the importance of alumni connections within investor-founder dyads.[8]

Our tests also carefully control for the presence of other networks. These are important because networks overlay each other, and each network could provide information or expertise that substitutes for the benefits of alumni network connections. In particular, we recognize past industry experience by the investor, whether there is a past funding relationship between the investor and founder, and (crucially) whether investors in this round have prior experience working together on other prior deals with a different company. Again, all of these controls fail to absorb the effect of shared alumni networks on both funding (extensive and intensive margins) as well as ex-post performance.

[6] That more VC funding increases post-funding IPO likelihood is not surprising. The next result is the key.

[7] Our robust datasource and development of counterfactuals also enables fixed effect controls to absorb unobservables associated with the VC / investor, which is often a key endogeneity concern.

[8] Note that both the university-specific specializations of partners/founders and a partner's distinct access to superior deal flow from their alma mater align with the information channel we propose.

A. Contributions to Literature

Our paper makes several important contributions. We first add to studies on the determinants of VC financing.[9] A common thread running through this literature is that resolving information frictions is paramount (see Da Rin et al. (2013) for a review). Bernstein et al. (2017) suggests a broad solution - that information about founding teams is perhaps the most important factor in attracting VC investors. But the ways in which specific founder attributes influence VC investors' decision-making remain unclear. We offer the first broad-sample exploration of a key founder characteristic - their alma mater. We specifically show that founders' connections through alumni networks are an important mechanism working to reduce uncertainty about founding team quality and facilitate VC financing.[10]

We also contribute to the literature on the effects of education networks in financial markets more broadly. Studies show that school connections improve the performance of mutual fund managers' investments (Cohen et al., 2008), sell-side analysts' stock recommendations (Cohen et al., 2010), and banks' loans (Engelberg et al., 2012). However, the influence of these networks on VC investments is neither well-understood nor easily-predicted, for several reasons. First, the most-related study in the VC literature, which examines connections between investors in a VC syndicate (rather than between founders and investors), shows that these connections lead to worse decision-making and hurt VC investors' performance (Gompers et al., 2016). Second, given the difficulty of obtaining early-stage funding and its importance for startup outcomes (Kerr et al., 2014), VC investors may be more likely to derive private utility from investing in companies from their alma mater than in other settings such as the stock market. Indeed, any favoritism exhibited toward connected startups could outweigh informational advantages and lead to worse performance and distortions in the

[9] See e.g., (Tian, 2011) for geographic proximity, (Ewens et al., 2018) for technological shocks, (Hellmann and Puri, 2015) for product market strategies, and (Bottazzi et al., 2016) for trust.

[10] We hasten to add that our broad sample evidence allows us to uniquely offer both external validity along with strong identification. This is a rarity in empirical corporate finance. However, in our case the inferences we make with the broadest sample are identical to our conclusions when we progressively tighten our identification.

allocation of capital. We contribute by providing the first direct evidence that alumni networks play a major role in shaping VC investment, and that ultimately, alum-connected investments outperform non-connected ones.

II. Data and Methodology

A. *Sample Construction*

We construct our main sample using data from PitchBook and the Department of Education's College Scorecard. PitchBook is the industry-standard for data on VC-backed companies (see, e.g., Retterath and Braun (2020), Brown et al. (2020), Gompers et al. (2021), Ewens et al. (2022)). The College Scorecard data include information on the characteristics of U.S. institutions of higher education such as enrollment, location, and average SAT score of students admitted.[11]

We restrict our tests to strictly VC rounds of financing. These are defined (in PitchBook) as "early-stage VC," "later-stage VC," or "Seed Round." We also restrict our investor types to PitchBook labels of "Venture Capital," "PE/Buyout," "Growth/Expansion," "Corporate Venture Capital," "Family Office," "Other Private Equity," or "Not-For-Profit Venture Capital." Our primary unit of observation for the analysis is at the startup-investor-deal level, where a deal is a round of financing for the startup, and investors are lead investors (which PitchBook defines as the investor(s) making the largest investment in the round – 85% of deals have a single lead). When appropriate, in later analyses, we collapse the data and run tests at less granular levels, such as the deal level.

From PitchBook we also collect information on the founding team and on partners working for the lead investor. We identify founding team members by keeping company employees with the following titles: Founders, CEO (Chief executive officer), CTO (Chief Technology officer), CMO (Chief Marketing officer), COO (Chief Operating

[11] The College Scorecard data can be found at: https://data.ed.gov/dataset/college-scorecard-all-data-files-through-6-2020/resources

officer), President, and Owner. We only keep people with these titles who started working for the company before the year the funding round was closed and were still working for the company in the year the round was closed. When employment start and end dates are absent from PitchBook data, we supplement this information using LinkedIn. We call this set of individuals "founding team" or "founders," although this can include people who joined the company in early years after its founding.

We collect extensive data on the education history of founders, the funding rounds, and whether the company exited via an initial public offering (IPO) or an acquisition as of June 2021. We then collect information on the education history of the partners working for the lead investor in each funding round.[12] Because our data on the quality of education institutions are for U.S. colleges and universities, we focus on deals involving U.S.-based startups and investors.

There is no common identifier between College Scorecard and PitchBook. Therefore, we perform a fuzzy name match, which we hand check, between the university attended by the founders and investors in PitchBook and the university name in the College Scorecard database. We match the 485 largest U.S. universities in the PitchBook data to College Scorecard. This results in our sample covering over 90 percent of all the deals in PitchBook (for which we have data on the education history of founders and at least one partner employed by the lead investor at the time of the deal). Hence, our final sample comprises the set of deals in PitchBook from 2000 to 2020 where either the founders of the portfolio company or the partners working for the lead venture capital firm attended one of the 485 largest U.S. universities.

[12] We identify partners by keeping employees with the following titles: Partners, Senior Partners, CEO, Founder, and Managing Director. We only consider partners that started working for the investment firm before the deal year and were still working there during the deal year. When employment start and end dates are absent from PitchBook data, we supplement this information using LinkedIn. We further restrict the set of partners to those that were affiliated with the specific fund within the investment firm that led the deal.

B. Summary Statistics

Table 1 presents descriptive statistics of our sample at five different levels: startups, founders, investors, deals, and universities. The startup-level statistics parallel those documented in extant work. The average startup in our sample has 1.63 rounds, skewed early with nearly two-thirds being seed rounds instead of later rounds. They raise an average of $26 million in cumulative funding across all their recorded equity deals. The companies also average 2.33 founders. Finally, VC-backed startups in our sample average a 6% IPO exit rate and a 26% M&A exit rate. See Ewens and Marx (2018) and Puri and Zarutskie (2012) for similar statistics on exits by VC-backed companies.[13]

Moving to founder-level statistics, we see that the average founder attended 1.46 higher educational institutions and founded 1.05 startups. Our investor-level statistics show that the average VC firm had around 7 unique lead partners tied to deals, was founded around 2005, and had an average and median AUM of $2.9 billion and $215 million, respectively.

At the deal-level, we provide summary statistics for all deals in our sample, as well as for the first deal for a startup. Since we focus some of our analysis on first deals (see Appendix A.2), it is reassuring that the number of lead investors, partners at lead investors, and founders, are all similar across the two groups. Moreover, as expected, both the amount raised and the post-money valuations are higher on average across all deals than for first deals.

Finally, our university-level statistics show that there is wide variation across schools in the number of lead investors and founders they produce. The statistics also document significant variation in university admission rates, SAT scores, and enrollment size. Hence, we control for this variation in our empirical specifications and use fixed effects where possible.

[Insert Table 1 Here.]

[13] To mitigate the concern of counting acquisitions that generate modest returns as successes, our statistic on acquisitions only counts an exit as an acquisition if we observe the sale price and if the sale price is at least twice the total investment amount in the company. See Yimfor and Garfinkel (2023) for support of the 2x filter.

C. Descriptive Evidence of Alumni Networks' Importance

We start by providing simple descriptive evidence on the importance of alumni networks in venture capital financing. We first examine the prevalence of entrepreneurs and founders from each of the top 20 U.S. universities and tabulate the investor-founder pairing rates at each school. We then document that same alma mater match rates between investors and founders far exceed random matching when we examine all universities in the data.

Table 2 presents statistics on the entrepreneurs and venture capital partners in our sample from the top 20 universities (according to U.S. News 2021 rankings of the best U.S. bachelor's degree-granting institutions). Columns 1, 2, and 3 present the rank, name, and recent data (2019) on the mean SAT score of accepted freshmen at these universities. Columns 4 and 5 present the number of founders per 1,000 students enrolled at the university and the number of startups founded by alumni of the university. Columns 6, 7, and 8 present the number of investors per 1,000 students from each school, the number of deals, and the percent of deals that are connected.

From Table 2, we see that the same alma mater match rate is high: VC partners with degrees from top universities tend to invest in startups from their alma mater 20-40% of the time. Nevertheless, there is also substantial variation in the number of deals involving startups and investors from the same alma mater, even amongst schools of similar prestige. While 45% of the deals with investors from Harvard involve at least one founder from Harvard, only 20% of the deals with investors from MIT also involve a founder from MIT.[14]

[Insert Table 2 Here.]

Next, we show that the high rate of matching between founders and investors from the same alma mater holds across the full set of universities in the data. Figure 1 presents a scatter plot of the chances that deals involve an investor from the founders' (same) alma mater against the proportion of all investors that are from the founders' alma maters. The

[14] It is worth noting here that Harvard has legacy admissions while MIT does not. We explore the potential importance of legacy in same alma mater deals as well as post-funding outcomes, below.

solid line represents the 45-degree line, which we would expect the data points to cluster along if founder-investor matching were random. Instead, the figure shows that founders are much more likely to pair with investors from their same alma mater. This result holds for highly-selective universities with average SAT scores over 1400, and appears even slightly stronger for universities with lower average SAT scores.

[Insert Figure 1 Here.]

III. Empirical Results

A. *Alumni Networks and the Extensive Margin of VC Investment*

In this section, we test whether alumni network connections influence deal selection, i.e., the extensive margin of venture capital funding. We start by examining whether investors tilt their portfolios toward startups from their alma mater, by comparing their actual investments to counterfactual investments they may have considered. We then explore cross-sectional variation in the effects. Finally, we use two separate event-based identification strategies to further isolate the effect of alumni connections on funding decisions. We first test whether, following a partner's departure from a VC firm, the firm reduces its investments in founders from the departing partner's alma mater. Second, we estimate the effect of founders' potential alumni networks of investors (VC partners) on the founder's receipt of VC funding, and then test for a reduction in the effect of this during the Covid-19 pandemic [which limited interactions between university alumni]. Our results throughout shed light on the economic mechanisms at work.

A.1. Investors' School Ties and Deal Selection

Our first test examines whether investors tilt their portfolios toward startups from their alma mater. This type of analysis is typically challenging because researchers only observe actual investments, and do not directly observe the full set of startups that investors considered. To circumvent this issue, we use data on Pitchbook deals consummated in the same industry, state, year, and stage as a focal investment, but with a different investor, as stand-ins for the counterfactual investments the focal investor could have made.

We first construct the dataset containing both actual investments and investors' potential/considered deals, then we compute connection measures for both the actual and potential deals. For example, in 2010, True Ventures (a venture capital firm) led a seed round for Duo Security, a Michigan-based startup operating in the Information Technology sector. To create the data for this extensive margin test, we need a set of counterfactuals comprised of other Michigan-based startups operating in the Information Technology sector that also received seed financing in 2010, but whose deals True Ventures did not lead. These were GamerSaloon and Local Orbit. So we view the general partners at True Ventures as deciding between investing in Duo Security or these other two companies. Consequently, in our test data, True Ventures will get three observations (one actual and two counterfactual). We then test whether True Venture's decision to invest in Duo instead of GamerSaloon or Local Orbit is influenced by the absence or presence of alumni ties between the partners at True Ventures and the founding teams at Duo, GamerSaloon, and Local Orbit (respectively).

Our extensive margin test is then a linear probability model explaining whether the deal is actually done, with the key independent variable being *Same Alma Mater*, an indicator equal to one if any of the VC partners share an alma mater with any of the founders. From VCs' perspective, the test evaluates whether they tilt their portfolios toward startups from their alma mater, relative to similar startups they could have invested in. Before formally implementing this test, we first provide graphical evidence that actual deals are more likely to exhibit connections than counterfactuals, then we provide summary statistics for the actual versus counterfactual deals and discuss the controls we will use.

Figure 2 presents binned scatter plots of the fraction of deals that include alumni investors, against the average SAT score of founders' alma maters (Panel A) and against the average size of founders' alma maters (Panel B). The plots document the relationship for both the actual deals and for the counterfactual deals. The results show that real deals are much more likely to include an alumni investor than counterfactual deals, and that this holds throughout the distribution of founder university quality and size.[15]

[Insert Figure 2 Here.]

Table 3 columns 1-4 present summary statistics for actual deals. A unit of observation in this table is a startup–lead investor–deal pairing. Because 85% of deals have a single lead investor, this dataset is similar to a deal level dataset. The first row of column 1 shows that 37 percent of deals feature a *Same Alma Mater* connection. Further statistics in column 1 show that 14% of the sample (or roughly a third of the alumni connections) had a founder and investor at the same university overlap for at least one year. It is also common for alumni connections to be within the same school (for example, Columbia Business School rather than Columbia University), and to occur within MBA programs. We explore the incremental effects of these tighter connections in our tests.

[Insert Table 3 Here.]

Table 3 also reports firm and deal characteristics that are well-known determinants of early-stage financing and serve as controls in our tests. (See, e.g., Bengtsson and Hsu (2010), Tian (2011), Howell (2017), and Ewens and Townsend (2020))

Mean SAT Score is the average SAT score of entering freshmen at the university attended by the founder of the portfolio company (averaged for companies with multiple founders), in the year preceding the investment.

University Size is the class size of graduating students from the founders' alma mater in the year preceding the deal.

Young Firm is an indicator for the firm being formed less than five years prior to the deal date. By design, our sample is largely composed of young firms (72%).

Distance is the average distance (in miles) between the portfolio company and the lead investor location. Several studies document the importance of distance in early-stage financing (e.g., Sorenson and Stuart (2001), Chen et al. (2010), Tian (2011)).

[15] We note that these binned scatter plots are based on data collapsed to the deal level, whereas our more formal regression analysis is conducted at the more granular startup–lead investor–deal level as discussed below.

Seed Round indicates the deal is the first recorded venture capital funding round for the company in PitchBook.

Past Funding Relationship is an indicator for an investor having already invested in the company in an earlier round.

Past Industry Experience is an indicator for when the lead investor in the deal has previously invested in a portfolio company in the same industry sector. PitchBook classifies industries into seven main sectors comprising: Business Products and Services, Consumer Products and Services, Energy, Financial Services, Healthcare, Information Technology, and Materials and Resources.

Past Affiliation captures how often the lead investor in the current round has collaborated with other lead investors that previously funded the startup (see Appendix C for construction details). Crucially, past affiliation captures whether there is an established relationship between the new and former investors in a startup.

Columns 1-4 present statistics for the full sample, the sample of connected (same alma mater) deals, the sample of unconnected deals, and the difference between connected and unconnected deals. The statistics show that connected deals tend to come from slightly higher SAT score schools and are closer to investors geographically. Columns 5-8 present a similar set of summary statistics for the counterfactual deals. Comparing the sample averages in column 1 to those in column 5 shows that the actual deals are similar to the counterfactual deals on each dimension, except in terms of *Past Funding Relationship* and *Past Affiliation* (which is largely by construction given the persistence in VC-startup relationships). Overall, these statistics provide support for using this set of startups as the counterfactual investments VCs may have considered.

At this point, we implement our extensive margin test for the effect of alumni network connections on deal selection. Table 4 presents the results. Column 1 shows that a shared alma mater between investor and founder increases the likelihood of investment by 0.22 percentage points. Given the mean probability of investment of 2.03%, a shared alma mater corresponds to an approximately 10% higher likelihood of an investor deciding to fund a startup. The regression controls for startup firm and deal characteristics, as well as investor-state-year-industry fixed effects. These high-dimensional fixed effects control for many potential confounders at both the investor and startup firm level. For instance, the fixed effects control for factors such as investor size, location, and specialization, as well as startup firms' state-year-industry. Importantly, the fixed effects ensure that our tests only draw inference from within investors considering similar investment opportunities.

[Insert Table 4 Here.]

Next, we examine cross-sectional variation in the effect of alumni network connections on investment. In the specification in column 2, we interact *Same Alma Mater* with *Mean SAT Score*. The coefficient on the interaction term is negative, showing that when SAT scores of the founder's university are higher, alumni connections with investors matter less. A one standard deviation increase in the average SAT score of founders' alma mater decreases the effect of *Same Alma Mater* on the likelihood of investment by 0.08 percentage points. Assuming university academic quality provides a public signal about founder or startup quality, the smaller effect of alumni connections when the public signal is strong, implies partial substitution. Put differently, the finding that connections matter less when founders have strong public signals of their quality, suggests that alumni connections' effect likely stems from their ability to resolve information asymmetries about founder quality.

Columns 3-5 present tests that examine the effects of tighter measures of alumni connections between founders and VC investors. Column 3 shows that the effect of connections nearly doubles when there is time overlap between when the investor and founder attended the same university. Columns 4 and 5 show that the results are largely driven by cases where founders and investors attended the same school within the university, or cases where both graduated with an MBA from the same university, respectively. Importantly, this cross-sectional variation in the effect of alumni connections on investment lines up with an explanation rooted in informational advantages, but it does not line up with explanations based on omitted variables such as founder/investor quality.

We report the results of several additional tests in the Internet Appendix. Table A.2 documents even stronger effects of alumni connections if we restrict the sample to first deals only, where there is greater information asymmetry about founders and startups. We also document that the results are robust to using measures of school quality based on graduated students' incomes rather than incoming students' SAT scores (Table A.3), or to using continuous measures of alumni connections based on the fraction of founder-investor pairs that attended the same university rather than an indicator variable (see Table A.4, and Appendix B for details on variable construction). Finally, we document that our main finding that alumni connections facilitate VC investment is not limited to the (already extensive) PitchBook universe. In Internet Appendix D, we discuss how we replicate our main result from Table 4 using a sample of startups constructed from LinkedIn data (see Table A.5).

Overall, the results thus far provide evidence that alumni networks influence the extensive margin of VC investment. The cross-sectional variation in the effect also suggests a mechanism rooted in informational advantages—which we explore further when we examine startup outcomes. We now turn to two event-based identification strategies to further pin down the alumni network effects documented above.

A.2. Evidence from VC Partner Departures

Our first identification strategy exploits partner departures from VC firms in order to isolate the effect of alumni networks on VC investment. We specifically test whether VC firms reduce their investment in startups from the departing partner's alma mater, following their departure. The identifying assumption is that partner departures are uncorrelated with time-series variation in the number of viable startups seeking funding from their alma mater. Existing research supports this assumption, by highlighting that partner departures are typically driven by idiosyncratic factors and partners' career concerns (Ivashina and Lerner, 2019). We also provide evidence supporting this identifying assumption by documenting that investments in startups (of grads) from the departing partner's alma mater, *do not decrease at other VCs during the same time period.*

Before conducting formal differences-in-differences tests, we provide graphical evidence describing VC investment around partner departures. Figure 3 Panel A plots the proportion of deals involving startups from the departing partner's alma mater, for the three years before and after departure. The figure shows a significant decline in investment, from around 11% pre-departure to under 9% post-departure, with the start of the decline coinciding directly with the partner's departure. These raw data suggest a significant effect of VC partners' school ties. Yet, one might be concerned that the decline in investment flowing to startups from the given university could reflect a broader industry trend. Fortunately, we can rule out this concern directly, by documenting that *other VCs* do not reduce their investment in startups from these same universities during the same years. Figure 3 Panel B in fact documents a slight upward trend in this industry-wide investment, although the economic magnitudes are small.

[Insert Figure 3 Here.]

To conduct our formal tests, we build an investor-alma mater-year panel covering 2000 to 2020, where each investor-year has observations for all 485 universities in our sample. The dependent variable is the fraction of the VC's deals during the year (multiplied by 100) that go to startups with founders from the given alma mater.[16] We then construct independent variables to implement differences-in-differences tests around partner departures. *I(Treated)* equals one if a partner from the VC-alma mater pair departed the VC at any time during the sample. *I(Post Departure)* equals one after the departure. The estimate on the interaction term, *I(Treated) X I(Post Departure)*, is the key coefficient of interest.

Table 5 presents the results. Across all specifications, we see that the key coefficient on the interaction term is significantly negative: after a partner leaves, the VC firm is less likely to invest in startups from their alma mater. In column 1, the coefficient on *I(Treated)* is 2.88, documenting that VC-alma mater pairs that at one point feature a

[16] Approximately 0.55% of all VC-alma mater-year pairs have at least one investment and the average fraction of investment for these pairs is 0.39%. For startups with founders from several universities, a deal counts toward each unique affiliation of the founding team.

departure, have higher overall fractions of investment—consistent with a positive effect of the partner pre-departure. The differences-in-differences estimate from the interaction term of -0.67 indicates that following a partner's departure, VCs decrease the fraction of their investments in startups from the partner's alma mater by 0.67 percentage points. This effect is large: it represents 23% (0.67 / 2.88) of the additional investment that was flowing to startups from that alma mater, and it is larger than the sample average fraction of investment for VC-alma mater-year pairs of 0.39%.

[Insert Table 5 Here.]

The results in columns 2 and 3 show that we find a similar-sized effect of VC partner departures after we control for school quality and then include investor fixed effects (respectively). Column 4 presents the results for the tightest specification. This specification includes investor-times-university fixed effects, which account for any unobservable factors pertaining to VC-alma mater pairs which remain fixed over time. Hence, our tests exploit only the time-series variation in the connections between VCs and universities due to partner departures. We view the effects documented here as strong evidence of a causal link between alumni network connections and the extensive margin of VC investment.

A.3. Evidence from VC Funding During the Covid-19 Pandemic

Our next set of tests continues study of the extensive margin, but looking at founders' potential alumni networks of investors (VCs) with looser restrictions. In particular, we don't require that the econometrician builds a set of counterfactuals (i.e. 'considered deals') from actual deals that happened nearby. Rather, these tests use the entire PitchBook database of startups; even those who do not receive funding. This allows us to create a dataset at the startup level, where the dependent variable is one when the startup gets funding, and zero when it does not.

Our analysis proceeds as follows. We first recognize that most startups need their first round within two years of founding, or else they run out of "friends-and-family" cash. Thus we set the dependent variable equal to one if they get a deal in the year of or the year following founding; zero otherwise. Then we seek a measure of potentially alumni-connected VC investors who might provide capital to the focal startup. We create a variable *P(Partners in Sector)* that equals the proportion of deals in the focal startup's industry sector - during the year of focal startup founding - that were led by partners from the focal founder's alma mater.[17] This variable (still) recognizes that VC investors tend to specialize in a sector. But now we have measured the fraction of them that have at least a nominal alumni connection.[18] Our thesis is that the variable has a positive effect on deal likelihood.

This new panel (data organization) also allows us to implement a second identification strategy; one that uses the Covid-19 Pandemic as a negative shock to the strength of alumni networks due to the reduction in in-person interactions between university alumni. We specifically ask whether any documented alumni-connection effect on the extensive margin is weakened by the presumed lack of in-person interactions during the window 2020 - 2021.

Table 6 presents our regression results. Column 1 supports our thesis. The likelihood that a startup receives VC funding is increasing in *P(Partners in Sector)*. The greater the fraction of VCs that did deals in the same sector as the focal (seeking) deal[19] that also share alma mater with the focal founder, the higher the likelihood a deal gets done.

[Insert Table 6 Here.]

To control for unmeasurable startup-quality effects, we assume these would be correlated with school quality (*Mean SAT Score*) and control for it. Columns 2 and 3 show that while school quality correlates with VC funding, the alumni networks effect is distinct from both school quality and school size effects, and remains large. We also note the results in column 4, which interacts *P(Partners in Sector)* with *Mean SAT Score*. It shows that alumni networks have the largest impact on access to VC funding for founders from schools with lower SAT Scores. This finding is consistent with earlier

[17] If there is more than one founder then we average *P(Partners in Sector)* across those founders.
[18] This proportion is 11.98% on average.
[19] in the year of the focal startup's founding

tests conducted from investors' perspective, and suggests an information channel.

Finally, we turn to our last column of results in Table 6, which is column 5. The sample is at the same observation level - firms founded. However, our intent is to see if the pandemic's limit on in-person interactions changes the influence of alumni connections at the extensive margin. Therefore we restrict the sample as follows.

We focus on startups founded immediately prior to and during the Covid-19 Pandemic (founded from 2018-2021). We then implement a differences-in-differences test, where we interact *P(Partners in Sector)* with an indicator for the startup being founded in 2020 or later.[20] Given restrictions on in-person interactions during the post-window, we expect information benefits from alumni connections would be mitigated. The results indeed show that the positive effect of alumni networks on startups' chances of receiving VC funding declined by roughly two-thirds during the pandemic, when in-person interactions between alumni were limited. The results are again consistent with our thesis.

B. *School Connections and Investment Size*

We now turn to the intensive margin of venture capital investment and examine whether school connections encourage investors to place larger bets on startups from their alma mater. We again use data on VC deals from PitchBook. The dependent variable in these tests is the *Ln(Funding Raised)* for the deal, and we control for the same firm and deal characteristics from prior tests.

In Table 7, we present three panels that vary our units of observation to enable various layers of fixed effects. In Panel A, we study the sample at the investor-deal level, and include investor-state-year-industry fixed effects. Panel B collapses the sample to the deal level and *Same Alma Mater* indicates whether any of the founders share the same alma mater as any partners working for the lead investor in the deal. Panel C presents tests at the alma mater-deal level, which permits the use of alma mater fixed effects. In the alma mater-deal data, a unit of observation is a deal and a university attended by at least one

[20] Thus the pre- and post- windows are similar length.

of the founders—a deal involving three founders that attended three different universities will have three unique observations.

In Panel A column 1, we see that *Same Alma Mater* predicts larger venture capital investments. The coefficient of 0.18 implies 18% more funding when a founder and investor on the deal attended the same university. This effect is meaningful in economic terms. Given the average funding amount of $17.80 million, an 18% increase represents $3 million in additional investment. Importantly, the tight fixed effects ensure that these tests only exploit variation within investor-state-year-industry, helping to reduce omitted variable concerns. Columns 2-5 explore cross-sectional variation in the effect and show that connections have the largest effect on funding when there is overlap in the dates of university attendance, and when the founder and investor were at the same school within the university (such as the business school within the university).

[Insert Table 7 Here.]

In Panel B, we collapse the sample to the deal level and find similar results. In fact, the coefficient on *Same Alma Mater* is slightly larger. This is due to the fact that Panel A intentionally limited the analysis to study variation within investors, whereas Panel B exploits more of the variation in the data and allows for comparisons across investors. In either setting, we find that alumni connections lead to significantly larger venture capital investments. Moreover, the cross-sectional variation in each setting lines up with an explanation based on within-network information advantages.

Finally, Panel C studies the relationship at the alma mater-deal level. This level of analysis allows for the inclusion of alma mater fixed effects, which are important as flexible controls for school unobservables (such as quality) that could influence funding amounts. These tests continue to show a strong positive effect of *Same Alma Mater*. Overall, we find that alumni network connections influence not only the extensive, but also the intensive margin of venture capital investment.

C. *Are Connected Investments More Informed?*

Despite the cross-sectional evidence up to this point that alumni connections reduce information frictions, there remains an alternative interpretation that is important to consider. Venture capital investors could tilt their portfolios toward startups from their alma mater due to favoritism, rather than reduced information asymmetry. This potential favoritism could be driven by in-group bias or overconfidence bias, where VCs overestimate the skills of founders from their university (e.g., Kahneman (2011)). To distinguish between an information channel versus favoritism, we examine post-funding outcomes for the startups in our sample that recieived funding in 2016 or earlier (to allow time to observe exits). If an information advantage is the primary mechanism, we would expect connected investments to perform at least as well as non-connected investments. In contrast, if favoritism is driving the tilt in investors' portfolios, we would expect connected investments to underperform.

Table 8 presents tests examining startups' likelihood of an IPO—the primary benchmark for success following early-stage funding (e.g., Hochberg et al., 2007; Gompers et al., 2016; Farre-Mensa et al., 2020). The tests examine the effect of *Same Alma Mater* on IPO likelihood with a linear probability model that controls for firm and deal characteristics. In Panel A, we conduct tests at the investor-deal level and include investor fixed effects so that we draw inferences based on variation in outcomes *within* an investor's portfolio. In Panel B, we collapse the data to the deal level and conduct similar tests using the broader variation across investors.

Panel A column 1 shows that investments in connected startups are 2.6 percentage points more likely to lead to an IPO than non-connected investments. Taking into account that 6% of investments lead to an IPO, the *Same Alma Mater* coefficient represents nearly a 50% increase in the likelihood of a successful exit via an IPO. This contrasts (indirectly) with Gompers et al. (2016), who report a cost of homophily among venture capitalists collaborating on deals by demonstrating that such deals are less likely to result in an IPO. Our findings suggest that relationships between co-investing VCs of the same ethnicity, as explored by Gompers et al. (2016), and those between founders and investors from the same university are fundamentally different. The latter may be based on shared experiences, values, or knowledge imparted by the same institution, potentially making partnerships more efficient. Whereas, the former may be driven by comfort or familiarity.

[Insert Table 8 Here.]

Columns 2-5 explore cross-sectional variation in the effect of *Same Alma Mater* on IPO likelihood. The results in column 2 show that the effect is stronger at schools with lower average SAT scores.[21] Importantly, this matches the cross-sectional variation in the effect of alumni connections on funding likelihood and deal size, suggesting an information channel explanation for our results. Columns 3-5 test for incremental effects of overlap in terms of university attendance window, school within the university, or MBA program. Here, only the MBA indicator is statistically significant.

Panel B studies the relationship at the deal level and implements state-year-industry fixed effects. We find broadly similar effects using this sample construction and control strategy. Overall, the tests in this section provide evidence that VCs' connected investments outperform their non-connected ones on average. This finding suggests that reduced information asymmetry, rather than favoritism, is likely the primary reason why venture capital investors tilt their portfolios toward startups from their alma mater.

We conduct two additional tests and report the results in the Internet Appendix. First, in Panel A and B of Table A.11, we examine the effect of alumni connections on the likelihood of a successful exit via M&A. The results are weaker than those for IPO exits, but still suggest a positive effect of connections. Second, we conduct a test to distinguish whether the positive effect of *Same Alma Mater* on IPO likelihood is due to ex ante screening (as prior results suggest) versus ex post monitoring/aid to startups. Specifically, we ask whether following a VC partner departure, the VC firms' existing portfolio companies from the departing partner's alma mater become less likely to exit via IPO (as one would expect if the effect were driven by monitoring). Table A.12 reports

[21] Mean SAT Score is standardized to have a mean of zero and standard deviation of one.

these tests, which do not find much evidence for this ex post monitoring channel.

C.1. Information vs. Favoritism: Evidence from a Marginal Outcomes Test

After documenting that connected investments outperform non-connected ones *on average*, we now turn our attention to the *margin*, for an even more direct test of the information versus favoritism channels. We implement a Becker marginal outcomes test framework. Specifically, we test whether the marginal dollar invested in same alma mater deals has a similar (or stronger) effect on the likelihood of an IPO-exit, than the marginal dollar invested in non-connected deals. If so, it suggests information benefits are behind the tilt in investors' portfolios. This is because, if investors were instead lowering the bar for same alma mater founders (i.e., exhibiting bias in their favor), we would expect marginally-funded connected deals to be of lower quality.

The crucial part of this analysis is identifying the margin of investment. We follow the Instrumental Variables approach to estimating outcomes at the margin that is used in Arnold et al. (2018) and Benson et al. (2019). For example, Benson et al. (2019) study bias in promotions by instrumenting for workers' promotions with the firm's average promotion rate, excluding the focal worker. This approach uses the fact that IV estimates represent the Local Average Treatment Effect (LATE) on instrument compliers, in order to estimate outcomes at the margin. The logic is that the workers who are only promoted when the promotion rate is high (i.e., instrument compliers) are effectively the marginally-promoted workers. Hence, estimating outcomes that are local to these compliers is akin to estimating outcomes at the margin of promotion.

Similar to Benson et al. (2019), we identify the margin of VC investment using an IV approach based on the amount of VC funding provided to startups in the same industry sector and year as the focal deal (excluding the focal deal itself). The intuition here is that, when there is a relatively large amount of funding available for startups in a certain industry, the startups that receive larger deals for this reason, are receiving funds at/near the margin of VC investment. Hence, when we use this approach to instrument for a startup's VC funding amount and examine the impact on IPO likelihood, we can interpret the estimates as effects at the margin of investment. We then compare the effect of marginal VC funding on exit, for connected deals versus non-connected deals, to test whether or not VCs are setting similar standards (in terms of expected IPO likelihood) for their investments in connected versus non-connected deals.

Table 9 presents the results of the marginal outcomes test. Columns 1 and 2 present the first stage for the connected (i.e., same alma mater (SAM)) deals and the non-connected deals, respectively. In each sample, the supply of VC funding within the focal deal's sector is a powerful instrument for the amount of funding provided in the focal deal. Columns 3 and 4 present the second stage results. In each sample, we find that the instrumented *Ln(Deal Size)* has a positive effect on IPO likelihood. Most important for our outcome test, is the comparison between these coefficients on *Ln(Deal Size)* for the connected deals versus the non-connected deals. We find that the coefficient is actually slightly *higher* in the connected deals sample in column 3.[22] This result suggests that, at the margin of VC investment, venture capitalists are holding startups with founders from their alma mater to at least as high of a standard as non-connected founders. This finding supports explanations for the tilt in investors' portfolios that are grounded in information advantages, rather than favoritism.

[Insert Table 9 Here.]

C.2. Legacy Admissions, and Access to Valuable Education Networks

Our final set of tests starts with a striking observation: the percentage of deals involving a same-alma-mater-investor is over twice as high when the founders are from universities that allow legacy admissions.[23] We document this finding in Figure 4 Panel A, which shows a binned scatter plot of the percentage of deals that are same-alma-mater against the average SAT Score at the founder's alma mater. We split the graph into cases where legacy is considered in admissions versus cases where it is

[22] We evaluate the statistical significance of this difference in the coefficients by running a pooled regression including both the SAM and Non-SAM samples, where all of the independent variables are interacted with the *Same Alma Mater* indicator. From this regression, we extract the p-value for the coefficient on *Ln(Deal Size)* × *Same Alma Mater* and report it in the bottom row of Table 9. The p-value of 0.03 indicates that the coefficients are statistically different.

[23] Schools that allow legacy admissions can consider the applicant's familial relationship to alumni of the institution in their admissions process.

not. The plot shows that throughout the school quality distribution, the deals involving founders from legacy schools are much more likely to have a same-alma-mater-investor, compared to deals of startups from non-legacy schools.

[Insert Figure 4 Here.]

While striking, there could be several explanations for this pattern in the data. First, the pattern could arise because startups from legacy admission schools are of higher quality and attract within-network investment. Second, it could arise due to favoritism in VC investment within legacy school networks. Or third, this pattern could arise because education networks at legacy admission schools are particularly thick, well-developed, and valuable to entrepreneurs looking to connect with venture capital investors.

To distinguish between these potential explanations, we examine the outcomes of startups from legacy versus non-legacy schools. Figure 4 Panel B plots the percentage of deals where the startup ultimately conducted an IPO against the SAT Score of the founder's alma mater, split by legacy versus non-legacy schools. The plot shows that the likelihood of an IPO is nearly identical for legacy and non-legacy schools across the school quality distribution. This finding cuts against explanations where legacy school startups are systematically better (which would lead to higher IPO likelihoods), or where legacy school startups receive significant favoritism from VC investors (which would lead to lower IPO likelihoods). Instead, the particularly strong tilt in investors' portfolios at legacy schools, combined with the similar startup performance at these schools, suggests that these education networks are particularly information-rich and valuable to aspiring entrepreneurs.

We formalize the test of this hypothesis in Table 10 with OLS and instrumental variable (IV) regressions relating IPO likelihoods to *Same Alma Mater* connections. Columns 1 and 2 present first stage results, where we use *Legacy Considered* - an indicator for at least one founder attending a university that considers legacy admissions - to instrument for a *Same Alma Mater* connection between founders and investors. The results in both columns show that *Legacy Considered* is a strong instrument for *Same Alma Mater*. In column 2, this persists even after controlling for university public/private status, SAT bins for school quality, and other university and deal characteristics. These results are consistent with networks at these universities being particularly valuable in terms of connecting founders with investors.

[Insert Table 10 Here.]

Columns 3 and 4 present our outcome results. In Column 3 we provide OLS estimates of the effect of *Same Alma Mater* (the dummy variable) on IPO likelihood. In Column 4 we use the IV estimate (from Column 2) and show the effect of *Same Alma Mater* on IPO likelihood. In both tests, the effect is positive and significant, providing further evidence that VCs' connected investments outperform. The IV estimates in Column 4 are particularly useful. Due to the LATE property of IV estimates, the interpretation is that even the founder-investor connections formed only due to the valuable networks at legacy schools, lead to stronger investment performance. This result suggests that the incremental within-network investments made at legacy schools, that would not be made at similar quality schools with more diffuse networks, are likely the result of reduced information frictions, rather than favoritism (which would predict these incremental legacy school investments to perform poorly).

Our findings here highlight the importance of access to well-developed alumni networks for prospective entrepreneurs looking to obtain VC funding. The benefits hold even after conditioning on school academic quality, naturally raising the question of which students benefit from this increased access to entrepreneurial finance. We take a first step addressing this in Table A.13. Specifically, the table summarizes student demographics at legacy admissions schools versus non-legacy schools. The statistics show that legacy schools have a slightly lower percentage of students from underrepresented minority groups (e.g., 19% of their students are Black or Hispanic, compared to 22% at non-legacy schools). An even larger difference arises based on socioeconomic status: legacy schools have far fewer students on Pell Grants (20% versus 30%), fewer first-generation college students (20% versus 30% again), and legacy school students are from families with 28% higher incomes ($103K versus $80K at non-legacy schools). As large as these current differences are, Table A.13 shows that in most cases, they were even larger historically (in the early 2000s when the data begin). Overall, this final set of results highlights the importance of equitable access to valuable university networks when discussing equality of opportunity in entrepreneurship.

IV. Conclusion

Entrepreneurial ventures are key contributors to innovation and long-term economic growth. Yet, founders of early-stage firms often struggle to obtain financing due to the severe information frictions between themselves and venture capitalists. In this paper, we present novel evidence that professional networks created by university attendance are a major force working to reduce information asymmetries and facilitate early-stage investment.

Using expansive new data from PitchBook on the education histories of founders and venture capital investors, we document that roughly one third of VC investments involve a shared university connection between a founder and investor. Our tests show that VCs tilt their portfolios toward startups from their alma mater, even relative to observably similar startups in the same state-industry-year. This occurs at both the extensive margin (deal selection) and the intensive margin (deal size). Both the cross-sectional variation in the effect and the superior performance of connected investments suggest that an information advantage, rather than favoritism, drives the tilt in portfolios.

Our findings demonstrate that university networks play an economically important role in reducing information frictions and supporting the flow of capital to early-stage ventures. The fact that these networks are particularly influential at universities that have historically, and still do, consider family legacy in the admissions process, highlights the importance of equitable access to these universities and networks for equal opportunity in entrepreneurship. Further exploration of network effects in early-stage financing, and of the distributional consequences of access to these networks is a promising area for future research.

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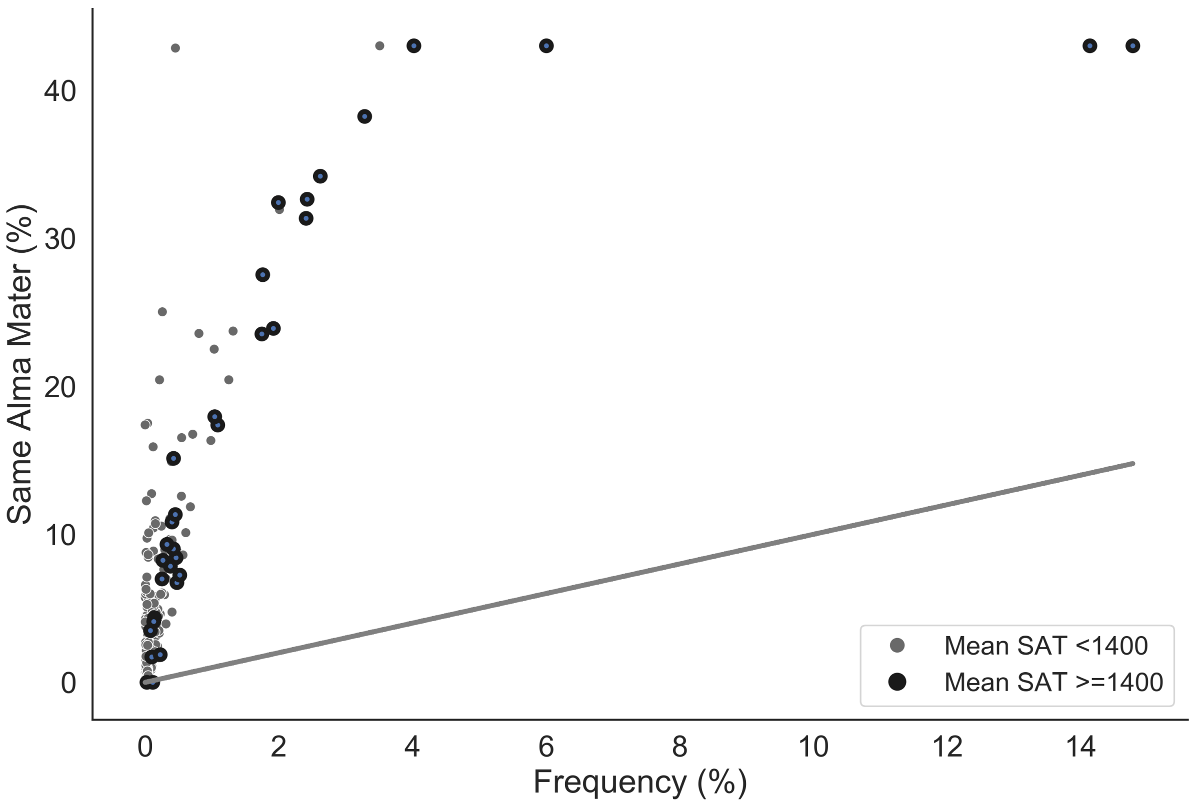
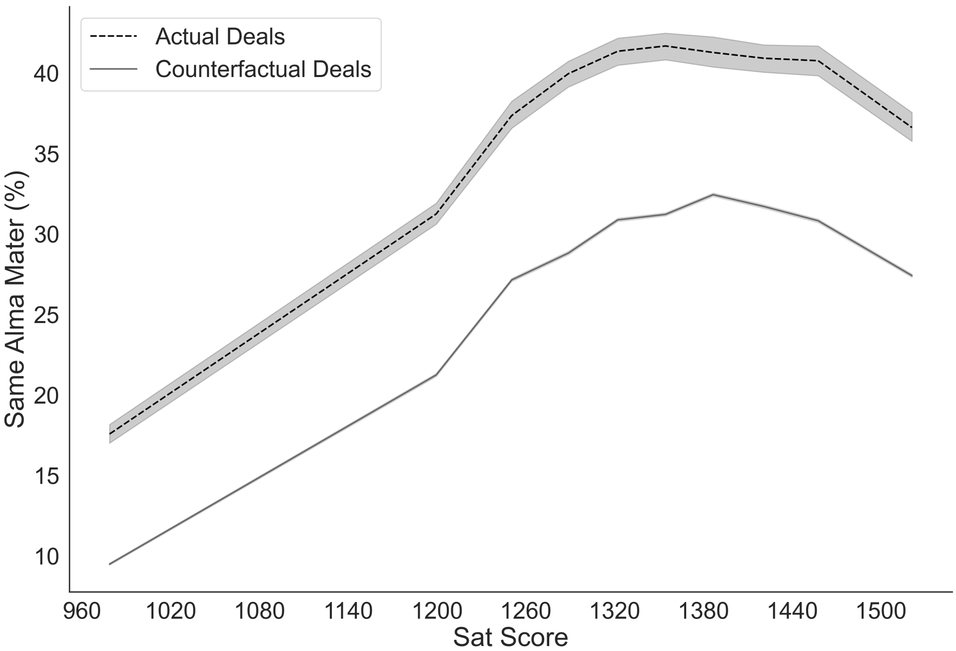


Figure 1: Alma Mater Ties vs. Random Matching
This figure presents a binned scatter plot of the relationship between the frequency of partner-level executives from an alma mater and deals involving founders from the same alma mater. We created this figure using a founder-deal-university dataset that included the number of investment firms in the deal as well as the number of investment firms where at least one partner-level executive working for the investment firm was from the same alma mater as the founder. We then collapsed this data to the university level. *Frequency* is the ratio of partner-level executives from a given university to the total number of partners working for all investment firms during our sample period, which is from 2000 to 2019. If a partner attended several universities, they contribute to each university's total. *Same Alma Mater* for each university represents the average proportion of deals involving founders from that university in which at least one partner-level executive working for the investment firm providing the funding was also an alumnus of the same university. The solid line represents the 45-degree line. Note that if connected ties were formed completely at random, we would expect *Same Alma Mater* to equal *Frequency*, as the likelihood that a founder draws a partner from their alma mater would equal the frequency of partners from their alma mater in the data; i.e., most points would lie on the 45-degree line. To show most data points, we winsorized *Same Alma Mater* at 43%, which is its 99$^{\text{th}}$ percentile value. The darker dots represent universities with an average SAT score of entering freshmen greater than 1400, while the grey dots represent universities with SAT scores under 1400.

Panel A: Education networks and school quality



Panel B: Education networks and university size

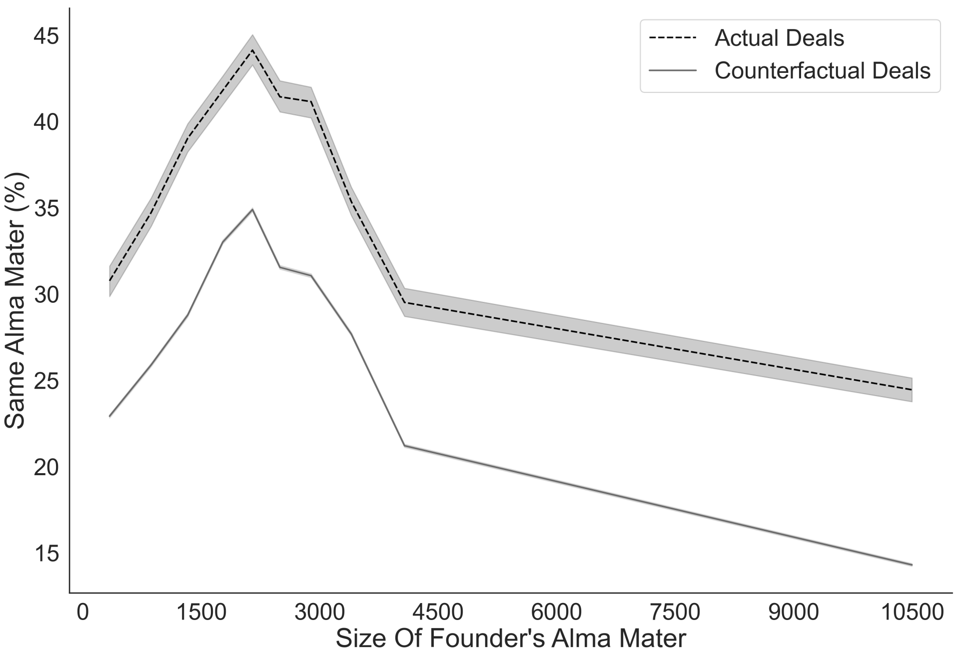
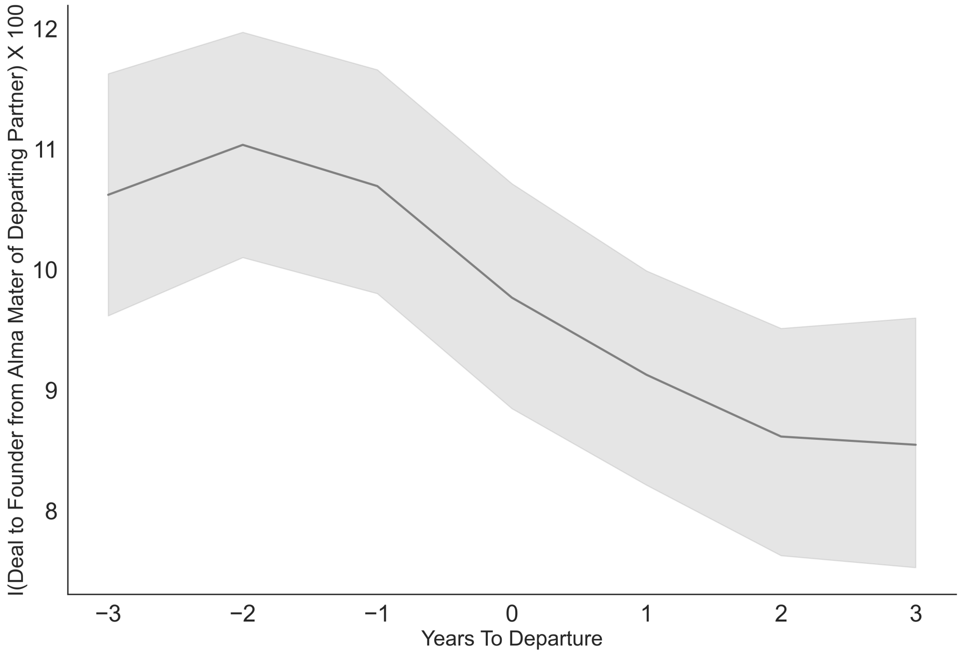


Figure 2: Education networks based on school quality and size

This figure presents a binned scatter plot describing the probability that a deal involves an investment firm where at least one partner-level executive at the firm attended the same university as one of the startup's founders (*Same Alma Mater*). In Panel A, deals are sorted into decile bins along the horizontal axis based on the most recent data on the average SAT score of accepted students at the founders' alma mater (averaged for startups with multiple founders). In Panel B, deals are sorted into decile bins along the horizontal axis based on the most recent data on the number of graduating students from the founders' alma Mater (averaged for startups with multiple founders). *Real Deal* shows the actual fraction of deals with university connections between investors and founders. *Counterfactual Deal* shows the number of university connections amongst founders and investors where, in addition to the actual deal, investors are also assigned all active deals in the same industry, year, state, and investment stage as the deal that they were actually involved in. The bands around each line represent 95 percent confidence intervals.

Panel A: VC Partner Departures and Deals to their Alma Mater



Panel B: Departures and Industry-Wide Deals to Founders from the Departing Partner's Alma Mater

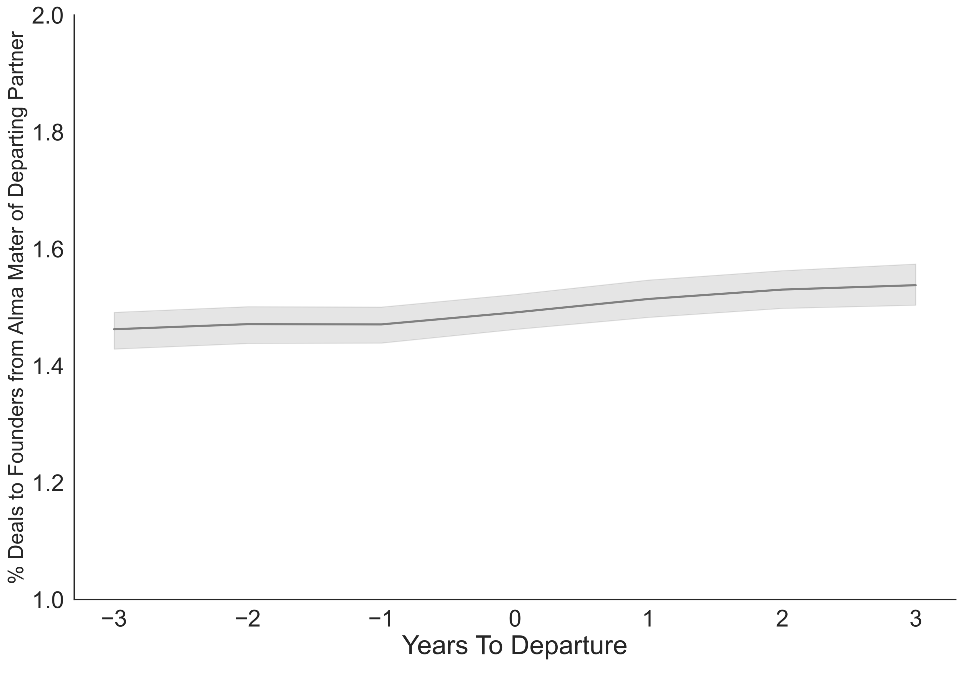
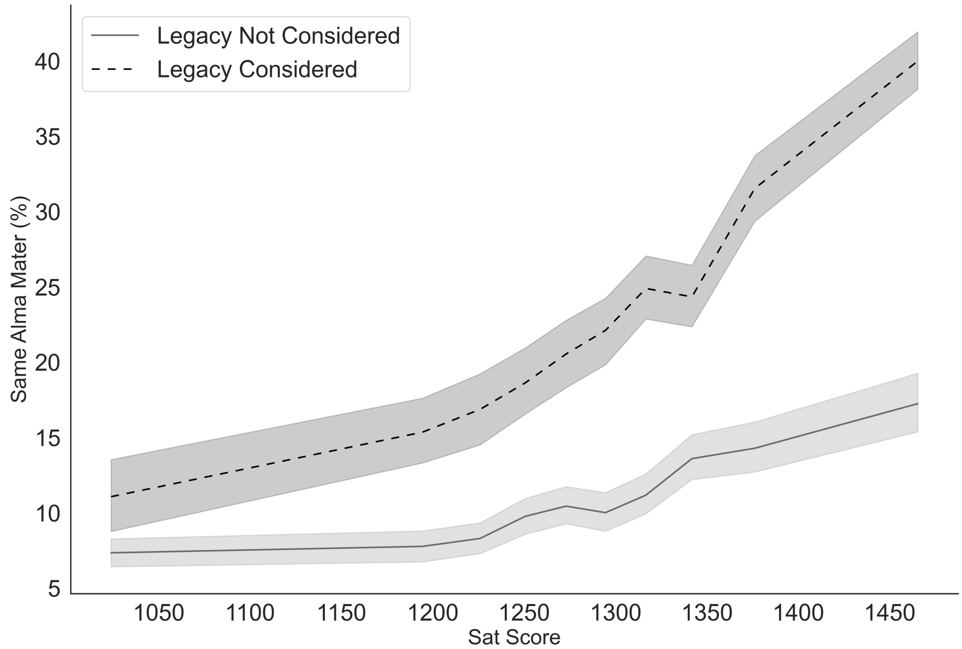


Figure 3: VC Partner Departures, Deals to their Alma Mater, and Industry-wide deals

This figure plots the relationship between partners leaving a VC firm and whether the firm continues to fund founders from the departing partner's alma mater (Panel A) and the industry-wide proportion of deals (Panel B) involving founders from the departing partner's alma mater. To generate the first figure, we create an investor-alma mater-year dataset tracking deals. We proxy for a partner's departure ($t = 0$) using the last year they led a deal at the VC firm. The figure focuses on VC firms with at least one departing partner and that made at least one investment in each of the six years around a partner's departure. The second figure depicts the fraction of industry-wide investment (excluding the focal VC firm) in startups from the departing partner's alma mater. The grey areas show the 95 percent confidence intervals.

Panel A: Education networks, School quality, and Legacy Admissions



Panel B: Performance, School quality, and Legacy Admissions

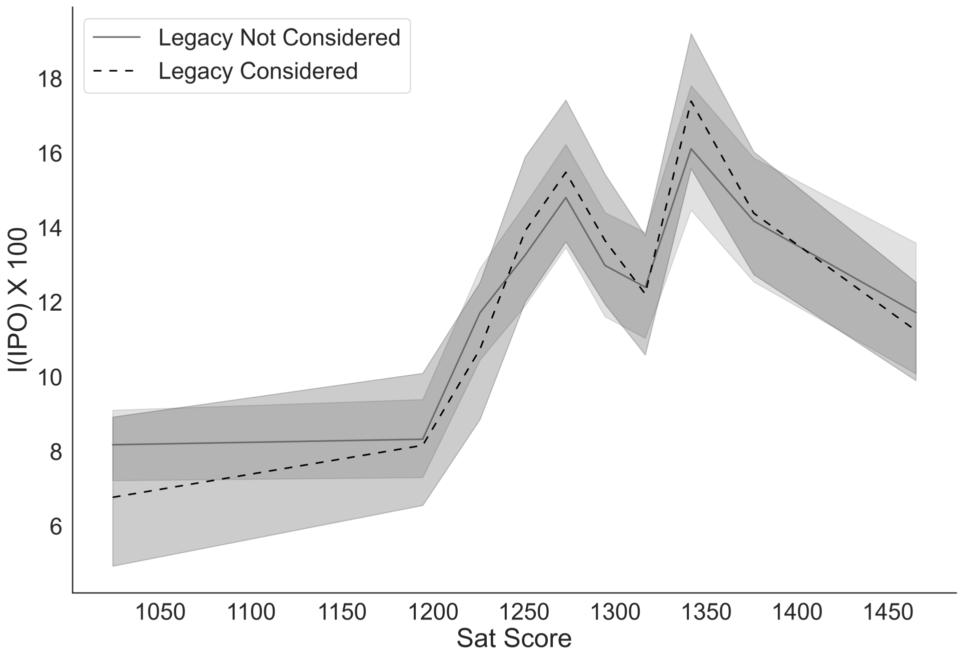


Figure 4: Legacy, Same Alma Mater, and Outcomes

This figure presents a binned scatter plot describing the probability that a deal involves an investment firm where at least one partner-level executive at the firm attended the same university as one of the startup's founders (*Same Alma Mater*). Deals are sorted into decile bins along the horizontal axis based on the most recent data on the average SAT score of accepted students at the founders' alma mater (averaged for startups with multiple founders). *Legacy Considered* shows the likelihood of a Same Alma Mater match by whether the founder attended a university that considers legacy admissions. *Legacy Not Considered* shows university connections amongst founders and investors where the founder attended a school that does not consider legacy admissions. In Panel B the y variable is an indicator for whether the startup exited for a value that is at least one and the half times the total amount of funding it raised before the exit. The bands around each line represent 95 percent confidence intervals.

Table 1: Summary Statistics

This table reports summary statistics for startups, founders, investors, deals, and universities appearing in the PitchBook data. In Panel A, the unit of observation is a startup that raised at least one round of VC funding. In Panel B, the unit of observation is a founder of a startup company that raised at least one round of VC funding. Founders are individuals whose title contains the following keywords: "founder," "founding," or "owner." In Panel C, the unit of observation is an investment firm that led at least one round of VC funding. In Panel D, the unit of observation is a VC deal, where the requisite data are available for our tests. In Panel E, the unit of observation is a university that at least one founder or investor participating in a VC deal attended. We define all variables in Table A.1.

	N	Mean	Std	25%	50%	75%	Max
A. Startup-level statistics							
Year Founded	18,022	2010.15	6.41	2007.00	2011.00	2015.00	2021.00
I(U.S. Headquarters)	18,022	1.00	0.00	1.00	1.00	1.00	1.00
I(Califoria Headquarters)	18,022	0.42	0.49	0.00	0.00	1.00	1.00
# Rounds	18,022	1.63	1.00	1.00	1.00	2.00	9.00
# Seed/Early stage Rounds	18,022	1.04	0.79	1.00	1.00	1.00	7.00
# Late Stage Rounds	18,022	0.59	0.91	0.00	0.00	1.00	8.00
Cumulative Amount Raised ($ Millions)	18,022	26.37	90.72	1.50	6.53	22.50	4911.94
Year First Funding Round	18,022	2013.91	4.64	2011.00	2015.00	2018.00	2021.00
I(M&A)	18,022	0.26	0.44	0.00	0.00	1.00	1.00
I(IPO)	18,022	0.06	0.23	0.00	0.00	0.00	1.00
# Founders	16,774	2.33	1.16	2.00	2.00	3.00	14.00
B. Founder-level statistics							
# Startups Formed	37,107	1.05	0.26	1.0	1.0	1.0	14.0
# Education Institutions	28,007	1.46	0.61	1.0	1.0	2.0	6.0
# Education Institutions Sample	25,078	1.37	0.56	1.0	1.0	2.0	5.0
C. Investor-level statistics							
# Lead Partners	1,662	6.77	10.35	2.00	4.0	7.00	168.0
AUM ($ Millions)	1,372	2906.18	21930.75	65.88	215.5	851.69	649000.0
Year Founded	1,626	2005.05	10.66	1999.00	2007.0	2013.00	2021.0

(Table 1 Continued)

	N	**Mean**	**Std**	**25%**	**50%**	**75%**	**Max**
D. Deal-level statistics							
All Deals							
# Lead Investors	29,421	1.14	0.43	1.00	1.00	1.0	7.00
# Partners at lead investors	18,673	5.28	4.66	2.00	4.00	7.0	41.00
# Founders	27,590	2.38	1.17	2.00	2.00	3.0	14.00
Amount Raised ($ Millions)	26,694	17.80	53.12	2.30	6.80	17.1	3400.00
Post Money Valuation ($ Millions)	18,070	151.56	1202.67	13.41	32.08	85.0	74314.06
First Deals Only							
# Lead Investors	18,022	1.12	0.40	1.00	1.00	1.0	7.0
# Partners at lead investors	10,865	4.87	4.29	2.00	4.00	6.0	35.0
# Founders	16,774	2.33	1.16	2.00	2.00	3.0	14.0
Amount Raised ($ Millions)	15,977	10.10	33.57	1.58	4.16	10.0	3000.0
Post Money Valuation ($ Millions)	10,070	48.46	337.08	9.25	18.20	40.0	30750.0
E. University-level statistics							
# Lead Investors	361	13.25	37.76	1.00	3.00	10.00	395.00
# Founders	442	26.05	55.22	3.00	6.00	22.00	574.00
Early Career Pay	474	61667.09	8533.82	55625.00	60000.00	65375.00	98900.00
Mid-Career Pay	474	113990.30	19675.16	99700.00	110700.00	124750.00	173700.00
Admission Rate	485	0.61	0.23	0.46	0.66	0.78	0.98
SAT Score	485	1221.95	134.03	1129.00	1198.00	1307.00	1566.00
University Size	485	2041.57	2147.34	497.00	1151.00	3106.00	15078.00

Table 2: Entrepreneurs and Investors from Top 20 Universities

This table presents statistics on founders and investors in our sample from the top 20 universities (according to U.S. News' 2019 rankings). Our sample is collected from PitchBook, and is restricted to firms receiving funding from 2000-2020, with founders/investors from U.S. universities, and with the required data for our tests. Columns 1, 2, and 3 present the rank, name, and the most recent data (2019) on the mean SAT score of accepted freshmen at these universities. Columns 4 and 5 present the number of founders per 1000 students enrolled at the university and the number of startups founded by alumni of the university. Columns 6, 7, and 8 present the number of partners per 1000 students from each school, the number of deals, and the percent of deals by the school's partners that are connected (involve at least one founder from the same university).

Alma mater			Entrepreneurs		Investors		
Rank	University Name	Mean SAT	# Founders Per 000s	# Firms	# Partners Per 000s	# Deals	% Same Alma Mater
1	Princeton University	1503	151.75	646	92.00	1075	30.14
2	Harvard University	1520	290.15	2589	213.70	4440	44.98
3	Columbia University	1512	134.44	1208	98.11	2030	27.98
4	MIT	1545	75.07	603	27.61	1022	20.35
5	Yale University	1517	72.79	746	43.84	1303	27.78
6	Stanford University	1497	336.59	2959	128.90	5143	49.06
7	University of Chicago	1520	68.45	671	63.80	1066	22.98
8	University of Pennsylvania	1492	82.28	1739	62.63	2925	36.17
9	Northwestern University	1508	43.71	656	21.08	1077	22.75
10	Duke University	1516	71.73	754	42.25	1208	24.42
11	Johns Hopkins University	1513	43.64	442	16.17	784	21.17
12	California Institute of Tech.	1566	203.09	224	43.30	375	22.13
13	Dartmouth College	1488	82.82	517	58.18	844	29.03
14	Brown University	1492	63.07	515	28.65	872	25.57
15	University of Notre Dame	1502	39.05	343	32.46	571	17.69
16	Vanderbilt University	1514	32.73	291	18.35	471	16.77
17	Cornell University	1471	48.57	1092	22.39	1785	24.48
18	Rice University	1513	33.59	202	14.17	334	14.97
19	Washington Univ. in St Louis	1506	31.60	329	17.43	528	20.83
20	UCLA	1423	20.47	1132	8.56	1872	28.42

Table 3: Characteristics of Startups and their Investors

This table reports summary statistics for our sample of early-stage equity financing deals. The sample is collected from PitchBook and is restricted to firms receiving funding from 2000-2020, with founders from U.S. universities and the required data for our tests. Columns 1-4 focus on actual deals and report the mean for the full sample, the mean for the set of deals with a founder-investor alma mater connection, the mean for the set of unconnected deals, and a t-test for differences between the connected and unconnected deals. Columns 5-8 report the same statistics for the sample of counterfactual deals. These counterfactual deals are selected by pairing each actual deal with other deals in PitchBook that the investor likely considered, i.e., those in the same State X Year X Industry X Stage (see Section III.A for details).

	Actual Deals (N = 18351)				**Counterfactual Deals (N = 885640)**			
	Full Sample	SAM Sample	DAM Sample	t-stat	Full Sample	SAM Sample	DAM Sample	t-stat
Same Alma Mater	0.37				0.33			
I(Overlapping Graduation)	0.14				0.10			
I(Same School)	0.32				0.27			
I(MBA)	0.31				0.26			
Mean SAT Score	1313.39	1343.59	1295.59	26.40***	1328.73	1361.73	1312.6	177.24***
University Size	2590.02	2300.33	2760.88	-18.26***	2536.30	2207.09	2695.71	-133.88***
Young Firm	0.72	0.73	0.72	0.60	0.75	0.72	0.77	-45.84***
Distance (miles)	1267.66	1131.5	1347.97	-7.89***	1276.56	1096.6	1363.59	-59.86***
Seed Round	0.17	0.13	0.19	-11.23***	0.15	0.1	0.17	-96.69***
Past Funding Relationship	0.23	0.26	0.22	6.26***	0.01	0.01	0.01	25.93***
Past Industry Experience	0.96	0.98	0.96	6.66***	0.98	0.99	0.97	47.01***
Past Affiliation	2.53	2.94	2.29	7.01***	0.64	0.97	0.48	69.18***

Table 4: Do Investors Tilt their Portfolios Toward Startups from their Alma Mater?

The tests in this table examine the effect of founders' and investors' shared educational backgrounds on the likelihood that investors fund startups. The table presents coefficients from OLS regressions run at an investor-deal level, with standard errors reported in parentheses. We focus on early-stage equity financing deals from 2000-2020, where the requisite data is available from PitchBook. A unit of observation is an investor deal. The sample includes an observation for each actual deal and synthetic deals constructed by pairing each investor with all deals in that same State X Year X Industry X Stage. The dependent variable is an indicator for being a real deal. The key independent variable, *Same Alma Mater*, indicates whether any of the founders share the same alma mater as an investor in the deal. *Mean SAT Score* is the average SAT score at the founder's alma mater in the year the startup raised funding (averaged for startups with multiple founders). We cluster standard errors by startup-investor pair.

Dependent Variable:	I(Investment) X 100				
	(1)	(2)	(3)	(4)	(5)
Same Alma Mater	0.2176***	0.2341***	0.1751***	0.0192	0.0637
	(0.0341)	(0.0357)	(0.0371)	(0.0617)	(0.0587)
Mean SAT Score	-0.0274	-0.0135	-0.0284*	-0.0267	-0.0274*
	(0.0167)	(0.0172)	(0.0167)	(0.0167)	(0.0167)
Same Alma Mater x Mean SAT Score		-0.0819**			
		(0.0379)			
I(Overlapping Graduation)			0.1461**		
			(0.0586)		
I(Same School)				0.2434***	
				(0.0655)	
I(MBA)					0.1936***
					(0.0631)
Ln(University Size)	0.0451***	0.0414***	0.0450***	0.0441***	0.0449***
	(0.0150)	(0.0151)	(0.0150)	(0.0150)	(0.0150)
Young Firm	0.2673***	0.2708***	0.2705***	0.2691***	0.2686***
	(0.0421)	(0.0421)	(0.0421)	(0.0421)	(0.0421)
Ln(distance)	-0.5154***	-0.5151***	-0.5141***	-0.5139***	-0.5141***
	(0.0283)	(0.0283)	(0.0283)	(0.0283)	(0.0283)
Past Funding Relationship	34.0103***	34.0086***	34.0050***	34.0077***	34.0080***
	(0.5073)	(0.5073)	(0.5073)	(0.5073)	(0.5073)
I(Seed Round)	1.3828***	1.3855***	1.3881***	1.3852***	1.3845***
	(0.0708)	(0.0708)	(0.0708)	(0.0708)	(0.0708)
Past Affiliation	0.5868***	0.5866***	0.5863***	0.5865***	0.5866***
	(0.0149)	(0.0149)	(0.0149)	(0.0149)	(0.0149)
Investor x State x Year x Industry FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.16	0.16	0.16	0.16	0.16
# Deals	29,421	29,421	29,421	29,421	29,421
# Startups	18,022	18,022	18,022	18,022	18,022
# Investment Firms	1670	1670	1670	1670	1670
Observations	903991	903991	903991	903991	903991

Table 5: Alumni Networks and Investment: Evidence from VC Partner Departures

This table examines the effect of a VC partner's departure from their firm on the proportion of the VC firm's investments that flow to startups with founders from the departing partner's alma mater. We run OLS regressions at the investor-alma mater-year level, pairing each VC firm with each of the 485 alma maters for which we have SAT scores. We track the proportion of deals allocated to founders from each university by the VC firm in each year from 2000 to 2020. The dependent variable, *P(Investment)*, represents the proportion of the investor's deals allocated to founders from a particular alma mater. Approximately 0.55% of all investor-alma mater-year pairs have at least one investment. The key independent variable, *I(Treated)*, which is at the Investor X University level, is an indicator for whether a partner at the VC firm, who attended a specific university, left the firm over the sample period. *I(Post Departure)* is an indicator that equals one in the years following the partner's departure. *SAT Score* is the SAT score of entering freshmen at the university in a given year. Standard errors are clustered by VC firm.

Dependent Variable:	Fraction of Investments X 100			
	(1)	(2)	(3)	(4)
I(Treated) X I(Post Departure)	-0.6722***	-0.6776***	-0.5397***	-0.5799***
	(0.1769)	(0.1766)	(0.1735)	(0.1955)
I(Treated)	2.8873***	2.4646***	2.3265***	
	(0.1413)	(0.1373)	(0.1333)	
SAT Score		0.2746***	0.2760***	
		(0.0098)	(0.0098)	
Adjusted R^2	0.004	0.007	0.011	0.073
# VC Firms	715	715	715	715
# Alma Mater	485	485	485	485
# Observations	2440665	2440665	2440665	2440665
Year FE	Yes	Yes	Yes	Yes
Investor FE	No	No	Yes	No
Investor X University FE	No	No	No	Yes

Table 6: Founders' Alumni Networks and Access to VC Funding

The tests in this table examine the effect of founders' educational backgrounds on the probability that the founder raises a round of venture capital funding. The table presents OLS regressions run at the startup level. We use the entire PitchBook database of companies formed between 2000 and 2021 where the founder attended at least one school on our list of U.S. universities. Our dependent variable is an indicator for whether the company raised a round of VC funding in the year of founding or the following year (23.48% of startups raised a round of VC funding within this timeframe). The key independent variable, *P(Partners in Sector)*, is the average proportion of deals led by partners from the same alma mater as the founder's, in the startup's industry sector, during the calendar year that the focal company was formed. The average value of this variable is 11.98%. When founders attended multiple schools this proportion is the average across all the schools they attended. *Mean SAT Score* is the average SAT score at the founder's alma mater in the year the startup was formed (averaged for startups with multiple founders). *Ln(# University Size)* is the log of the number students (averaged for startups with multiple founders) graduating from the founder's alma mater. *I(Founded >= 2020)* is an indicator for startups formed in 2020 or later, a proxy for startups most exposed to the effects of the Covid-19 pandemic. Column 5 only includes startups formed in 2018 or later. Standard errors are clustered by startup.

Dependent Variable:	I(VC Funding) X 100				
	(1)	(2)	(3)	(4)	(5)
P(Partners in Sector)	20.7161***		8.7425***	34.3342***	17.3587***
	(1.2577)		(1.6992)	(3.6845)	(5.3526)
Mean SAT Score		3.7137***	2.8216***	2.5513***	1.8012**
		(0.1786)	(0.2453)	(0.2481)	(0.7299)
Ln(University Size)			0.2277	-0.6894***	-1.1930*
			(0.2294)	(0.2514)	(0.6484)
P(Partners in Sector) X Mean SAT Score				-20.4713***	
				(2.6648)	
I(Founded >= 2020) X P(Partners in Sector)					-12.7134*
					(6.5123)
Adjusted R^2	0.08	0.08	0.08	0.08	0.08
# Startups	71509	71509	71509	71509	11840
State x Year x Industry FE	Yes	Yes	Yes	Yes	Yes

Table 7: Do Investors Place Larger Bets on Startups from their Alma Mater?

The tests in this table examine the effect of educational connections between founders and investors on the amount of funding raised. Panel A presents OLS regressions run at the investor-deal level. The sample includes investor-deal combinations for VC deals from 2000-2020, where the requisite data is available from PitchBook. The dependent variable is the log amount of funding raised, and the key independent variable, *Same Alma Mater*, indicates whether any of the founders share the same alma mater as a partner working for the investment firm at the time of the deal. Panel B presents similar OLS regressions run at the deal level. Panel C presents similar OLS regressions run at the alma mater-deal level, which permits the use of alma mater fixed effects. Standard errors are clustered by investor in Panel A, and by startup in Panels B, and C.

A. Investor-Deal Level Tests					
Dependent Variable:			Ln(Funding Raised)		
	(1)	(2)	(3)	(4)	(5)
Same Alma Mater	0.1825***	0.1837***	0.0976**	0.0460	0.2124***
	(0.0367)	(0.0369)	(0.0393)	(0.0743)	(0.0705)
Mean SAT Score	-0.0133	-0.0067	-0.0140	-0.0117	-0.0134
	(0.0241)	(0.0259)	(0.0240)	(0.0241)	(0.0241)
Same Alma Mater x Mean SAT Score		-0.0212			
		(0.0376)			
I(Overlapping Graduation)			0.2208***		
			(0.0465)		
I(Same School)				0.1552**	
				(0.0755)	
I(MBA)					-0.0346
					(0.0692)
Ln(University Size)	0.0149	0.0141	0.0137	0.0147	0.0148
	(0.0202)	(0.0204)	(0.0202)	(0.0202)	(0.0202)
Young Firm	-0.4117***	-0.4109***	-0.4031***	-0.4141***	-0.4114***
	(0.0431)	(0.0431)	(0.0431)	(0.0430)	(0.0430)
Ln(distance)	0.0052	0.0054	0.0052	0.0061	0.0051
	(0.0346)	(0.0346)	(0.0347)	(0.0346)	(0.0346)
Past Funding Relationship	0.0573	0.0573	0.0546	0.0558	0.0577
	(0.0386)	(0.0386)	(0.0385)	(0.0386)	(0.0386)
I(Seed Round)	-1.2019***	-1.2012***	-1.1952***	-1.2025***	-1.2023***
	(0.0528)	(0.0529)	(0.0529)	(0.0528)	(0.0528)
Past Affiliation	0.0219***	0.0217***	0.0211***	0.0219***	0.0218***
	(0.0038)	(0.0038)	(0.0038)	(0.0038)	(0.0038)
Investor x State x Year x Industry FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.69	0.69	0.69	0.69	0.69
# Startups	5677	5677	5677	5677	5677
# Deals	6047	6047	6047	6047	6047
# Investors	1514	1514	1514	1514	1514
# Observations	6379	6379	6379	6379	6379

(Table 7 Continued)

B. Deal Level Tests					
Dependent Variable:	Ln(Funding Raised)				
	(1)	(2)	(3)	(4)	(5)
Same Alma Mater	0.3436***	0.3442***	0.2662***	0.2947***	0.2391***
	(0.0232)	(0.0232)	(0.0256)	(0.0431)	(0.0434)
Mean SAT Score	0.0039	0.0071	0.0022	0.0044	0.0038
	(0.0159)	(0.0173)	(0.0159)	(0.0159)	(0.0159)
Same Alma Mater x Mean SAT Score		-0.0122			
		(0.0244)			
I(Overlapping Graduation)			0.2217***		
			(0.0331)		
I(Same School)				0.0567	
				(0.0432)	
I(MBA)					0.1244***
					(0.0436)
Controls	Yes	Yes	Yes	Yes	Yes
State x Year x Industry FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.40	0.40	0.40	0.40	0.40
# Startups	10232	10232	10232	10232	10232
# Deals	15535	15535	15535	15535	15535
# Observations	15535	15535	15535	15535	15535

C. **Alma mater-Deal Level Tests**			
Dependent Variable:	Ln(Funding Raised)		
	(1)	(2)	(3)
Same Alma Mater	0.1073***	0.0950***	0.0793***
	(0.0188)	(0.0240)	(0.0206)
Year x Industry FE	Yes	No	No
Alma Mater x Year x Industry FE	No	Yes	Yes
Controls	No	No	Yes
Adjusted R^2	0.05	0.07	0.32
# Startups	10054	10054	10054
# Universities	485	485	485
# Observations	52808	52808	52808

Table 8: The Performance of Connected vs. Non-connected Investments

The tests in this table examine the effect of educational connections between founders and investors on the probability of an IPO post-funding. Panel A presents OLS regressions run at the investor-startup level. We keep the first investment by the lead investor in the startup and track whether the investment exits via an IPO following the initial investment. The sample includes investor-deal combinations for VC deals from 2000-2016, where the requisite data are available from PitchBook. We end the sample in 2016 to allow enough time for an exit. The dependent variable is an indicator for whether the startup in the deal eventually exits via an IPO by June 2021 (see the appendix for exits via successful acquisitions). The key independent variable, *Same Alma Mater*, indicates whether any of the founders share the same alma mater as a partner at the investment firm. *Ln(Funding Raised FD)* is the amount of funding the startup raised from the lead investor in the first funding round. Compared to Table 7, this table is missing the control for *Past Funding Relationship* because this variable are not defined for an investor's first financing of the startup. Panel B presents similar OLS regressions run at the deal level. Standard errors are clustered by investor in Panel A and by startup in Panel B.

A. Investor-Startup Level Tests					
Dependent Variable:	I(IPO)				
	(1)	(2)	(3)	(4)	(5)
Same Alma Mater	2.5675***	2.0554***	2.6066***	1.8463	-0.0300
	(0.5985)	(0.6030)	(0.6866)	(1.2930)	(1.0635)
Mean SAT Score	0.6265**	1.2823***	0.6274**	0.6329**	0.6215**
	(0.2954)	(0.3184)	(0.2957)	(0.2951)	(0.2953)
Same Alma Mater x Mean SAT Score		-2.3305***			
		(0.6362)			
I(Overlapping Graduation)			-0.1085		
			(0.9699)		
I(Same School)				0.8320	
				(1.3362)	
I(MBA)					3.1134***
					(1.1327)
Ln(University Size)	0.0090	-0.0524	0.0091	0.0065	0.0103
	(0.2868)	(0.2875)	(0.2868)	(0.2870)	(0.2868)
Young Firm	0.1193	0.1504	0.1183	0.1233	0.1387
	(0.7309)	(0.7296)	(0.7309)	(0.7308)	(0.7313)
Ln(distance)	-0.3194	-0.3097	-0.3199	-0.3178	-0.3145
	(0.2670)	(0.2668)	(0.2669)	(0.2671)	(0.2670)
I(Seed Round)	1.6391***	1.6693***	1.6373***	1.6410***	1.6803***
	(0.5336)	(0.5334)	(0.5336)	(0.5337)	(0.5341)
Past Affiliation	-0.0405	-0.0460	-0.0402	-0.0409	-0.0427
	(0.0572)	(0.0574)	(0.0573)	(0.0572)	(0.0571)
Ln(Funding Raised FD)	3.2411***	3.2442***	3.2434***	3.2401***	3.2386***
	(0.3070)	(0.3069)	(0.3080)	(0.3070)	(0.3068)
Investor FE	Yes	Yes	Yes	Yes	Yes
First Deal Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.08	0.08	0.08	0.08	0.08
# Startups	7110	7110	7110	7110	7110
# Investors	857	857	857	857	857
Observations	10012	10012	10012	10012	10012

(Table 8 Continued)

B. Startup-Level Tests					
Dependent Variable:			I(IPO)		
	(1)	(2)	(3)	(4)	(5)
Same Alma Mater	1.9230***	1.7750**	2.5560***	2.3208	-0.1752
	(0.7123)	(0.7124)	(0.8332)	(1.7893)	(1.4353)
Mean SAT Score	0.8367**	1.0416***	0.8552**	0.8330**	0.8385**
	(0.3573)	(0.4029)	(0.3572)	(0.3577)	(0.3573)
Same Alma Mater x Mean SAT Score		-0.7631			
		(0.7551)			
I(Overlapping Graduation)			-1.8707		
			(1.1934)		
I(Same School)				-0.4553	
				(1.8277)	
I(MBA)					2.4931*
					(1.4962)
Ln(University Size)	0.4754	0.4461	0.4718	0.4760	0.4855
	(0.3441)	(0.3453)	(0.3441)	(0.3442)	(0.3440)
Young Firm	-0.2518	-0.2325	-0.2459	-0.2508	-0.2858
	(0.9846)	(0.9839)	(0.9842)	(0.9849)	(0.9846)
Ln(distance)	-0.0637	-0.0568	-0.0639	-0.0647	-0.0615
	(0.2940)	(0.2942)	(0.2942)	(0.2938)	(0.2939)
I(Seed Round)	2.1798***	2.2101***	2.1484***	2.1771***	2.2269***
	(0.6140)	(0.6149)	(0.6145)	(0.6133)	(0.6152)
Past Affiliation	0.1016*	0.1016*	0.1072*	0.1020*	0.0973
	(0.0598)	(0.0599)	(0.0599)	(0.0598)	(0.0596)
Ln(Funding FD)	3.3567***	3.3628***	3.3838***	3.3560***	3.3557***
	(0.3155)	(0.3157)	(0.3172)	(0.3157)	(0.3154)
Controls	Yes	Yes	Yes	Yes	Yes
State x Year x Industry FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.10	0.10	0.10	0.10	0.10
# Startups	6736	6736	6736	6736	6736
Observations	6736	6736	6736	6736	6736

Table 9: Information or Favoritism? Evidence from a Marginal Outcomes Test

This table presents Instrumental Variable (IV) regressions examining the effect of VC funding on the likelihood that a company exits via an IPO. The tests are conducted at the deal level, and we instrument for the key independent variable, *Ln(Deal Size)*, with the amount of funding raised by startups in the same state X stage X year X industry sector as the deal, *excluding* the focal deal. The dependent variable, *I(IPO)*, is an indicator for whether the startup exits via an IPO by June 2021. Columns 1 and 2 present the first stage for the same alma mater (SAM) deals and the unconnected deals (Non-SAM), repectively. Columns 3 and 4 present the second stage results for each of these samples. Standard errors are clustered by startup.

	First Stage		**IV**	
Dependent Variable:	Ln(Deal Size)		I(IPO)	
	SAM (1)	Non-SAM (2)	SAM (3)	Non-SAM (4)
Ln(Supply Funding)	0.2405***	0.2294***		
	(0.0278)	(0.0266)		
Ln(Deal Size)			0.1913***	0.1111***
			(0.0392)	(0.0270)
Mean SAT Score	-0.0063	-0.0016	0.0130	0.0111**
	(0.0315)	(0.0199)	(0.0101)	(0.0049)
Ln(University Size)	0.0139	0.0450**	-0.0101	0.0050
	(0.0303)	(0.0199)	(0.0098)	(0.0048)
Young Firm	-0.3782***	-0.3864***	0.0447*	0.0454***
	(0.0488)	(0.0423)	(0.0250)	(0.0167)
Ln(distance)	0.1815***	0.1565***	-0.0300***	-0.0089
	(0.0177)	(0.0164)	(0.0093)	(0.0056)
Past Funding Relationship	-0.2562***	-0.3835***	0.0267	0.0311**
	(0.0447)	(0.0451)	(0.0162)	(0.0140)
I(Seed Round)	-1.3346***	-1.2490***	0.2523***	0.1391***
	(0.0757)	(0.0659)	(0.0690)	(0.0437)
Past Affiliation	0.0314***	0.0216***	-0.0019	-0.0003
	(0.0060)	(0.0073)	(0.0019)	(0.0009)
State, Year, Industry FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.37	0.34	-0.09	-0.14
# Deals	4132	5899	4132	5899
Cragg-Donald Wald F			88.74	104.84
P Value Diff. Coef				0.03

Table 10: The Value of Educational Networks: Evidence from Legacy Admissions

This table presents OLS and IV regressions examining the effect of educational connections between founders and investors on the likelihood that a company exits via an IPO. The tests are conducted at the deal level. The dependent variable, *I(IPO)*, is an indicator for whether the startup exits via an IPO by June 2021. The key independent variable is the indicator *Same Alma Mater*. We instrument for *Same Alma Mater* with an indicator, *Legacy Considered*, which equals one if any of the founders attended a university that considers legacy admissions. Columns 1 and 2 present the first stage results, without and then with controls. Column 3 presents OLS results and column 4 presents the IV results. Standard errors are clustered by startup.

	First Stage		**OLS**	**IV**
Dependent Variable:	Same Alma Mater		I(IPO)	
	(1)	(2)	(3)	(4)
Legacy Considered	0.3012***	0.1868***		
	(0.0119)	(0.0151)		
Same Alma Mater			0.0322***	0.1518**
			(0.0079)	(0.0610)
I(Public University)		-0.0668***	0.0219**	0.0432***
		(0.0165)	(0.0100)	(0.0155)
Top SAT Quintile		0.2712***	0.0217	-0.0139
		(0.0239)	(0.0168)	(0.0252)
Second SAT Quintile		0.2177***	0.0342**	0.0057
		(0.0181)	(0.0139)	(0.0204)
Third SAT Quintile		0.1786***	0.0340***	0.0097
		(0.0166)	(0.0121)	(0.0170)
Fourth SAT Quintile		0.1006***	0.0291***	0.0143
		(0.0152)	(0.0112)	(0.0131)
Adjusted R^2	0.12	0.18	0.11	-0.06
# Startups	6868	6868	6868	6868
# Deals	9426	9426	9426	9426
Cragg-Donald Wald F				168.01
Other Controls	No	Yes	Yes	Yes
State x Year x Industry FE	Yes	Yes	Yes	Yes

Alumni Networks in Venture Capital Financing

Internet Appendix

Appendix A. PitchBook's Coverage

Figures A.1 and A.2 compare the coverage of startups and early-stage financing deals in PitchBook with Crunchbase and VentureXpert, other frequently used datasets of early-stage high-growth companies. [24] Figure A.1 shows that VentureXpert and Crunchbase include at most 60 percent of the deals in our sample in any given year, with this percentage decreasing over time. Figure A.2 shows that PitchBook has better deal coverage for the firms listed in all three databases.[25] This is especially important given that it affects the construction of variables such as past collaboration between investors, or past funding relationships, which are likely correlated with shared education networks. Moreover, Table A.8 in the Internet Appendix reveals that firms missed by CrunchBase tend to be smaller and secure less funding. These are the types of firms most likely to benefit from alumni connections due to their high levels of information asymmetry. A database missing deals would limit the external validity of the results, and could lead researchers to miscalculate important controls, potentially confounding the effect of alumni networks on funding and entrepreneurial outcomes.

Appendix B. Constructing P-Same Alma Mater

Our aim is to construct a measure of alumni connections between founders and partners employed by the lead investor. Naturally, larger founding teams or lead investors employing many partners would be more likely to have an alumni connection. To ensure that our results are robust to this consideration, we normalize the number of alumni connections as follows.

We begin by constructing potential matches between founders and investors. The

[24] An important caveat that this analysis does not consider is the possibility of VC-backed deals existing in Crunchbase and VentureXpert that do not appear in PitchBook for our data period. For a comparative analysis of coverage across various databases, see Retterath and Braun (2020). These authors gather deal data from a large venture capital firm in Europe to examine how comprehensively different databases cover the deals. They consistently rank PitchBook above the other databases, particularly when comparing coverage of startup founders.

[25] We match the firms to VentureXpert and CrunchBase on founding year, state, and then require a 100 percent fuzzy match on the standardized name, which we verify for accuracy.

number of unique founder-university and partner-university pairs (for each deal) is our target measure. For instance, if a founder attended two universities and a partner affiliated with the lead investor also attended two universities, then the number of potential matches would be four. Formally, for portfolio company i and lead investor j in the year t of company's funding round, we calculate the metric of potential matches as:

$$\text{Potential Matches}_{ijt} = \prod N_{it} E_i N_{jt} E_j, \tag{B1}$$

where N_{it} is the count of the founding team of company i, and N_{jt} is the count of senior team members working for the fund within the lead investment firm j in year t, and E_i and E_j are the number of unique universities associated with the founders of company i and partners of investment firm j, respectively.

Then, for each portfolio company and lead investor, we use the number of potential matches to scale the actual connection count between founders and lead partners associated with a deal. In other words, we calculate a probability that the deal involves an alumni match between the founder and the lead investor. This probability is size-independent.

We present robustness checks of our main result using this probability measure in our Appendix Table A.4. Our findings remain consistent with our benchmark results that use a simple indicator for the existence of an alumni connection between the founder and the lead investor.

Appendix C. Constructing Past Affiliation

We construct a measure of past collaborations amongst investors in a company. This measure captures collaborations between the lead VC firm in the current round of funding and other lead investors that funded the startup in previous rounds. We define past affiliation as follows:

$$\text{Past Affiliation}_{ij} = \frac{\sum_k \sum_p I_{ij} I_{kj} I_{ip} I_{kp}}{\sum_{kj} I_{kj}}, \tag{C1}$$

where i stands for the lead investor in startup j, k indexes all past investors in startup j, p indexes previous investments in other startups, and I_{kj} takes a value of one when VC firm k previously funded startup j. Thus, Past Affiliation captures the strength of relations between VC firm i and other past investors in startup j.

For example, consider a startup that has raised a Seed and a Series A round, where the Seed round was led by investor k, and the Series A round by investor i. Further suppose that this deal occurred in 2010. If VC firm i and k have never previously invested in the same startup p prior to 2010, past affiliation is zero. If they had jointly invested in 2 startups prior to 2010, then past affiliation is 2.

For example, consider a startup has raised a Seed and a Series A round, where the Seed round was led by investor k, and the Series A round by investor i. Further suppose that this deal occurred in 2010. If VC firm i and k have never previously invested in the same startup p prior to 2010, past affiliation is zero. If they had jointly invested in 2 startups prior to 2010, then past affiliation is 2.

Appendix D. Replication in the LinkedIn Sample

In this Appendix, we extend the main result from Table 4 to a potentially broader universe of young firms. We obtain LinkedIn data from a data aggregator called Datahut. We then examine startups that meet the criteria that the founder attended a U.S. university and that they are associated with a company in the LinkedIn "companies" dataset. We further require that the company is U.S.-based, and not missing data on location and founding year. Our final sample comprises 11,157 companies formed between 2000 and 2015 by founders attending one of the 485 schools in our sample. The presumption is that these companies would welcome VC funding.

We then reconstruct our *Same Alma Mater* variable, using a similar approach as we did for the Table 4 analysis. First, we match the set of companies from LinkedIn to PitchBook on founding year, state, and name to build a dataset of companies that got VC funding. Then we define counterfactuals as all LinkedIn companies in the same state, industry, and founding year as the company that had an actual VC funding event. Presumably, they would all welcome VC funding, but only one (or some) received it. Recipients of VC funding are the "ones" and non-recipients are the "zeroes" in this extensive margin test. The key independent variable is again *Same Alma Mater*.[26]

The results are presented in Table A.5. In column 4, the preferred specification, the coefficient on *Same Alma Mater* is 0.88% and is statistically significant. Since the unconditional probability that a company in these data receives VC funding is 2.57%, alumni connections correlate with a 31% increase in the likelihood of getting VC funding. It is important to note that this test investigates the likelihood of an investment by a VC (Investor FE) considering two startups in the same state (State FE), formed in the same year (Founding Year FE), and operating in the same industry (Industry FE) that differ by whether the startup founders attended the same alma mater as the partners at the investment firm. Our fixed effects absorb time-varying investment preferences across investors, industries, geographies, and founding year. The results here are consistent with our main results using the PitchBook universe, providing further evidence of the effect of alumni connections on the extensive margin of VC investment.

[Insert Table A.5 Here.]

[26] Most of our Table 4 controls are unavailable because our analysis here is a true extensive margin—the counterfactuals do not receive any VC funding.

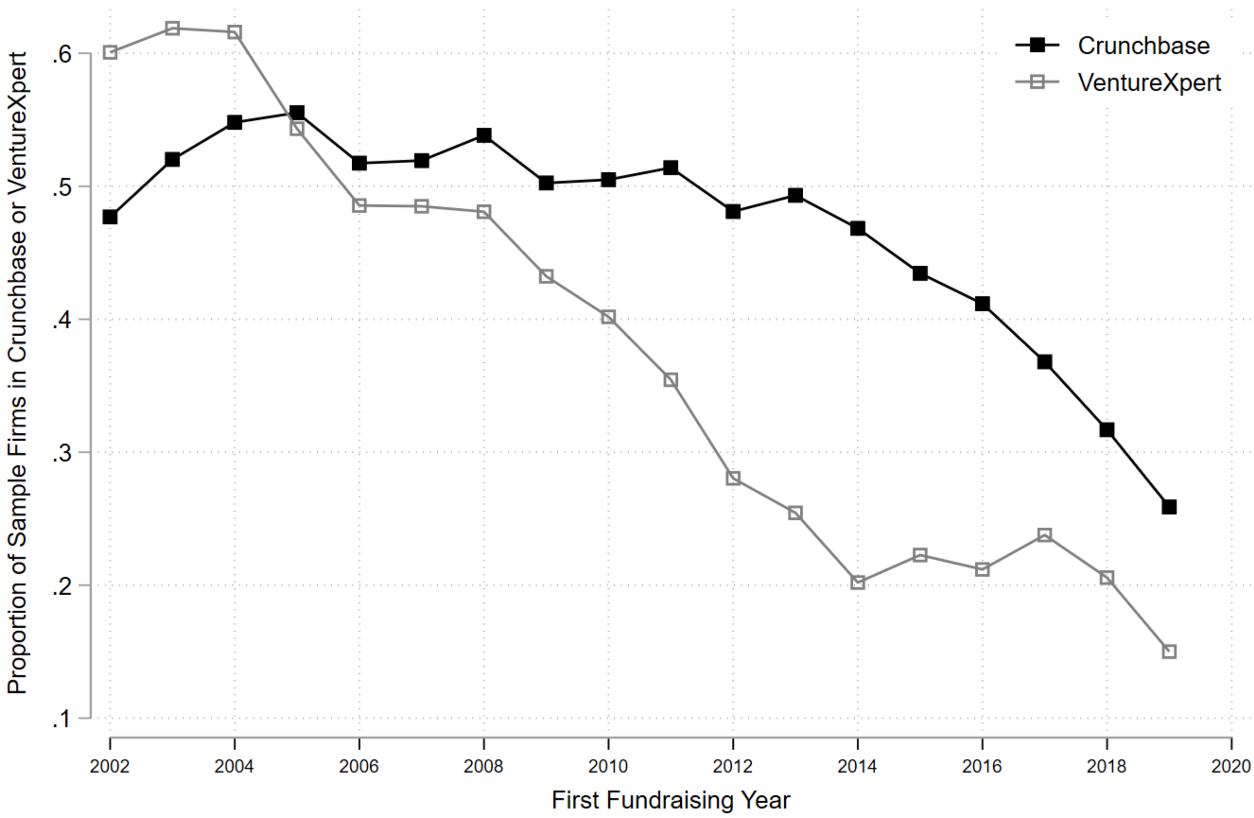


Figure A.1: PitchBook relative to other databases
This figure shows the proportion of startups in our sample that are also covered by Crunchbase and VentureXpert. We match the startups to VentureXpert and CrunchBase on founding year, state, and then require a 100 percent fuzzy match on the standardized name, which we verify for accuracy. For each startup in our sample we keep the first year in which it raises funding, *First Fundraising Year*. Our of the 28,277 startups in our sample (before any filtering on covariates available for our tests), 12,102 matched to Crunchbase and 8,081 matched to VentureXpert. We see that less than 60 percent of firms in our sample are covered by VentureXpert or Crunchbase in a given year. However, post 2005, Crunchbase appears to have better coverage than VentureXpert.

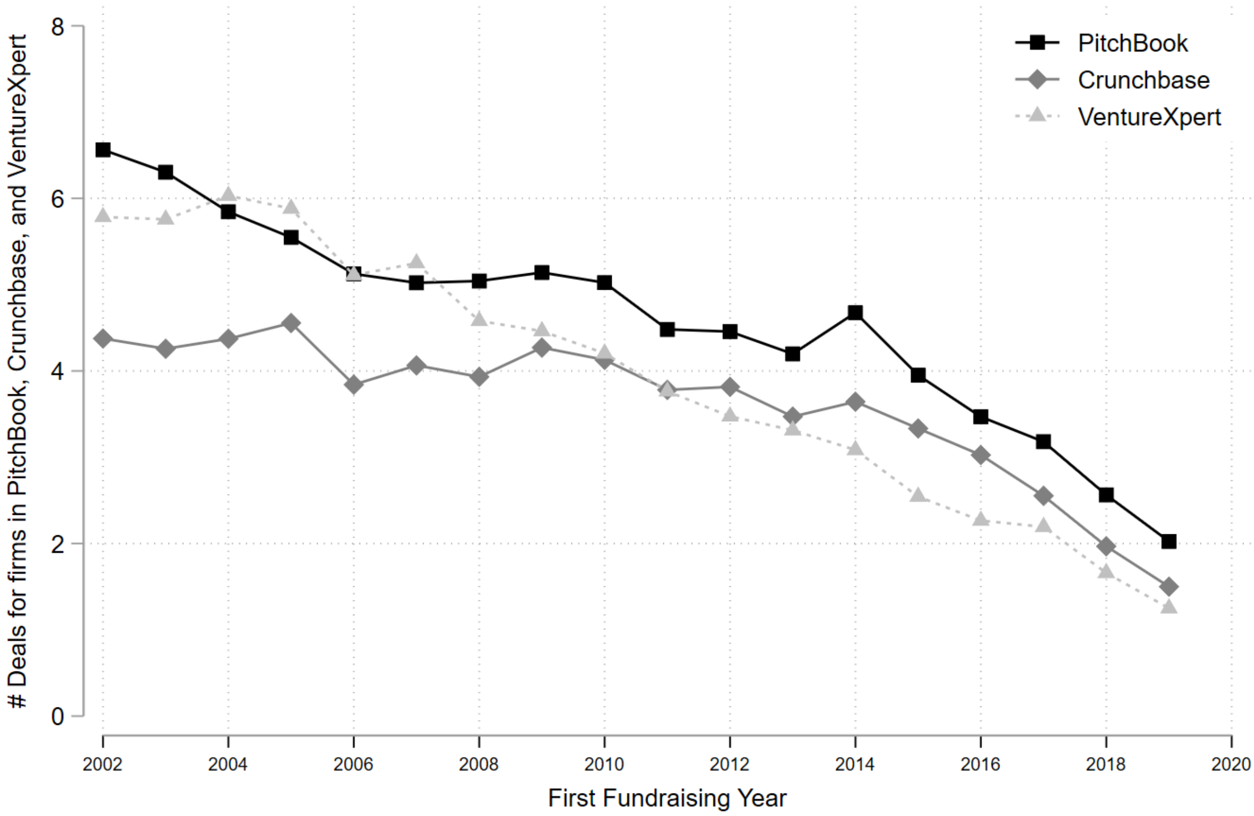


Figure A.2: PitchBook relative to other databases (Matched Sample)
This figure shows the number of deals for firms in our sample in Crunchbase and VentureXpert. We match the startups to VentureXpert and CrunchBase on founding year, state, and then require a 100 percent fuzzy match on the standardized name, which we verify for accuracy. Out Of the 28,277 startups in our sample, 4,918 matched to Crunchbase and VentureXpert. For each of these startups, we keep the first year in which it raises funding, *First Fundraising*, and count the number of deals in PitchBook, CrunchBase, and VentureXpert. Besides 2004 and 2005, PitchBook appears to have better coverage of deals than either VentureXpert or Crunchbase.

Table A.1: Variable Definitions

Variable Name	**Definition**
Same Alma Mater	Indicator that equals to one if any of the founders share the same alma mater as an investor in the deal.
Mean SAT Score	Average SAT score of entering freshmen at the university attended by the founder of the portfolio company (averaged for companies with multiple founders)
University Size (000s)	The number of graduating students from the founders' alma mater in the year preceding the deal.
Young Firm	An indicator that equals one if the firm was formed less than five years before the date of financing
Distance (miles)	The average distance (in miles) between the portfolio company and the investors participating in the deal.
Past Funding Relationship	An indicator that equals one if any investor in the current deal already invested in the company in an earlier round.
First Funding Round	Indicator equals one if the deal is the first recorded funding round for the company in PitchBook.
Past Industry Experience	An indicator that equals one if an investor in a given deal already previously invested in a portfolio company in the same industry as the firm currently receiving the investment.
Past Affiliation	Indicator that equals one if an investor in a current round has previously collaborated with the startup's existing investors, in other rounds excluding the current round, on prior deals involving other startups.
I(Overlapping Graduation Years)	Indicator that equals to one if any of the founders share the same alma mater as an investor in the deal and they graduated within four years of each other.
# Investors	The number of investors participating in the deal.
IPO	Indicator equals one if the firm goes public in the years following the funding round but before the second quarter of 2021
Acquired	Indicator equals one if the firm is acquired in the years following the funding round but before the second quarter of 2021
Funds Raised ($ Millions)	Amount of funding raised by the firm in the current funding round

Table A.2: Do Investors Tilt their Portfolios Toward Startups from their Alma Mater? (First Deals Only)

The tests in this table examine the effect of founders' and investors' shared educational backgrounds on the likelihood that investors fund startups. The table presents coefficients from OLS regressions run at an investor-deal level, with standard errors reported in parentheses. We focus on early-stage equity financing deals from 2000-2020, where the requisite data is available from PitchBook. A unit of observation is an investor deal. The sample includes an observation for each actual deal and synthetic deals constructed by pairing each investor with all deals in that same State X Year X Industry X Stage. The dependent variable is an indicator for being a real deal. The key independent variable, *Same Alma Mater*, indicates whether any of the founders share the same alma mater as an investor in the deal. *Mean SAT Score* is the average SAT score at the founder's alma mater in the year the startup raised funding (averaged for startups with multiple founders). We cluster standard errors by startup-investor pair.

Dependent Variable:	I(Investment)					
	(1)	(2)	(3)	(4)	(5)	(6)
Same Alma Mater	1.0669***	1.1653***	0.8053***	0.2763	0.4239*	0.6324***
	(0.1293)	(0.1423)	(0.1400)	(0.2413)	(0.2391)	(0.2338)
Mean SAT Score	-0.0654	-0.0262	-0.0701	-0.0615	-0.0644	-0.0671
	(0.0539)	(0.0549)	(0.0539)	(0.0539)	(0.0539)	(0.0539)
Same Alma Mater x Mean SAT Score		-0.3215**				
		(0.1526)				
I(Overlapping Graduation)			1.0562***			
			(0.2545)			
I(Same School)				0.9713***		
				(0.2629)		
I(MBA)					0.8039***	
					(0.2607)	
I(Bachelors)						0.5561**
						(0.2563)
Ln(University Size)	0.1112**	0.0988**	0.1092**	0.1099**	0.1112**	0.1148**
	(0.0493)	(0.0494)	(0.0492)	(0.0493)	(0.0493)	(0.0493)
Young Firm	-0.5823*	-0.5858*	-0.5649	-0.5844*	-0.5842*	-0.5803*
	(0.3524)	(0.3525)	(0.3524)	(0.3525)	(0.3524)	(0.3524)
Ln(distance)	-1.7541***	-1.7519***	-1.7502***	-1.7493***	-1.7494***	-1.7485***
	(0.0922)	(0.0922)	(0.0922)	(0.0922)	(0.0922)	(0.0922)
I(Seed Round)	0.1790	0.1904	0.2082	0.1810	0.1824	0.1874
	(0.2305)	(0.2304)	(0.2305)	(0.2305)	(0.2305)	(0.2306)
Past Affiliation	0.9725***	0.9724***	0.9718***	0.9723***	0.9725***	0.9724***
	(0.0356)	(0.0356)	(0.0356)	(0.0356)	(0.0356)	(0.0356)
Investor x State x Year x Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.13	0.13	0.13	0.13	0.13	0.13
# Deals	8767	8767	8767	8767	8767	8767
# Startups	8767	8767	8767	8767	8767	8767
# Investment Firms	1181	1181	1181	1181	1181	1181
Observations	138807	138807	138807	138807	138807	138807

Table A.3: Do Investors Tilt their Portfolios Toward Startups from their Alma Mater? (Early Career Pay in lieu of SAT Score)

The tests in this table examine the effect of founders' and investors' shared educational backgrounds on the likelihood that investors fund startups. The table presents coefficients from OLS regressions run at an investor-deal level, with standard errors reported in parentheses. We focus on early-stage equity financing deals from 2000-2020, where the requisite data is available from PitchBook. A unit of observation is an investor deal. The sample includes an observation for each actual deal and synthetic deals constructed by pairing each investor with all deals in that same State X Year X Industry X Stage. The dependent variable is an indicator for being a real deal. The key independent variable, *Same Alma Mater*, indicates whether any of the founders share the same alma mater as an investor in the deal. *Early Career Pay* is the average early career pay of graduates of the founder's alma mater according to PayScale (averaged for startups with multiple founders). We cluster standard errors by startup-investor pair.

Dependent Variable:	I(Investment)					
	(1)	(2)	(3)	(4)	(5)	(6)
Same Alma Mater	0.6209***	0.7037***	0.4595***	0.1978**	0.1707*	0.3044***
	(0.0580)	(0.0668)	(0.0616)	(0.0939)	(0.0880)	(0.0958)
Ln(Early Career Pay)	-0.1140***	-0.0884***	-0.1150***	-0.1120***	-0.1127***	-0.1153***
	(0.0226)	(0.0231)	(0.0226)	(0.0226)	(0.0226)	(0.0226)
Same Alma Mater x Ln(Early Career Pay)		-0.2267***				
		(0.0686)				
I(Overlapping Graduation)			0.7199***			
			(0.1253)			
I(Same School)				0.5746***		
				(0.1083)		
I(MBA)					0.6294***	
					(0.1034)	
I(Bachelors)						0.4321***
						(0.1090)
Ln(University Size)	0.0187	0.0133	0.0181	0.0172	0.0178	0.0194
	(0.0221)	(0.0221)	(0.0221)	(0.0221)	(0.0221)	(0.0221)
Young Firm	0.1353**	0.1443**	0.1412**	0.1373**	0.1382**	0.1373**
	(0.0568)	(0.0569)	(0.0568)	(0.0568)	(0.0568)	(0.0568)
Ln(distance)	-0.7585***	-0.7585***	-0.7569***	-0.7568***	-0.7564***	-0.7554***
	(0.0416)	(0.0416)	(0.0416)	(0.0416)	(0.0416)	(0.0416)
Past Funding Relationship	39.5813***	39.5750***	39.5716***	39.5781***	39.5754***	39.5795***
	(0.6071)	(0.6071)	(0.6071)	(0.6071)	(0.6071)	(0.6071)
I(Seed Round)	2.4529***	2.4588***	2.4652***	2.4587***	2.4587***	2.4551***
	(0.1329)	(0.1329)	(0.1329)	(0.1329)	(0.1329)	(0.1329)
Past Affiliation	0.6620***	0.6618***	0.6611***	0.6618***	0.6615***	0.6618***
	(0.0210)	(0.0210)	(0.0210)	(0.0210)	(0.0210)	(0.0210)
Investor x State x Year x Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.18	0.18	0.18	0.18	0.18	0.18
# Deals	18930	18930	18930	18930	18930	18930
# Startups	11942	11942	11942	11942	11942	11942
# Investment Firms	2449	2449	2449	2449	2449	2449
Observations	609868	609868	609868	609868	609868	609868

Table A.4: Do Investors Tilt their Portfolios Toward Startups from their Alma Mater? (Alma Mater Scaled by Potential Pairs)

The tests in this table examine the effect of founders' and investors' shared educational backgrounds on the likelihood that investors fund startups. The table presents coefficients from OLS regressions run at an investor-deal level, with standard errors reported in parentheses. We focus on early-stage equity financing deals from 2000-2020, where the requisite data is available from PitchBook. A unit of observation is an investor deal. The sample includes an observation for each actual deal and synthetic deals constructed by pairing each investor with all deals in that same State X Year X Industry X Stage. The dependent variable is an indicator for being a real deal. The key independent variable, *P-Same Alma Mater*, is the fraction of founder-investor pairs that attended the same university. *Mean SAT Score* is the average SAT score at the founder's alma mater in the year the startup raised funding (averaged for startups with multiple founders). We cluster standard errors by startup-investor pair.

Dependent Variable:	I(Investment)					
	(1)	(2)	(3)	(4)	(5)	(6)
P-Same Alma Mater	0.1288***	0.2429***	0.1043***	0.0392	0.0358	0.0805***
	(0.0161)	(0.0289)	(0.0173)	(0.0283)	(0.0263)	(0.0292)
Mean SAT Score	-0.0307*	-0.0717***	-0.0312*	-0.0287*	-0.0291*	-0.0302*
	(0.0166)	(0.0189)	(0.0166)	(0.0166)	(0.0166)	(0.0166)
P-Same Alma Mater x Mean SAT Score		-0.1330***				
		(0.0247)				
P-Overlap			0.0620***			
			(0.0187)			
P-Institute				0.1046***		
				(0.0290)		
P-MBA					0.1099***	
					(0.0275)	
P-Bachelors						0.0574**
						(0.0291)
Ln(University Size)	0.0579***	0.0458***	0.0578***	0.0562***	0.0568***	0.0586***
	(0.0151)	(0.0152)	(0.0151)	(0.0151)	(0.0151)	(0.0151)
Young Firm	0.2522***	0.2565***	0.2533***	0.2529***	0.2528***	0.2522***
	(0.0420)	(0.0420)	(0.0420)	(0.0420)	(0.0420)	(0.0420)
Ln(distance)	-0.5133***	-0.5070***	-0.5130***	-0.5133***	-0.5134***	-0.5125***
	(0.0282)	(0.0282)	(0.0282)	(0.0282)	(0.0282)	(0.0282)
Past Funding Relationship	34.0176***	34.0088***	34.0147***	34.0167***	34.0163***	34.0174***
	(0.5071)	(0.5071)	(0.5071)	(0.5071)	(0.5071)	(0.5071)
I(Seed Round)	1.3633***	1.3725***	1.3661***	1.3632***	1.3627***	1.3636***
	(0.0707)	(0.0707)	(0.0707)	(0.0707)	(0.0707)	(0.0707)
Past Affiliation	0.5874***	0.5868***	0.5872***	0.5874***	0.5875***	0.5874***
	(0.0149)	(0.0149)	(0.0149)	(0.0149)	(0.0149)	(0.0149)
Investor x State x Year x Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.16	0.16	0.16	0.16	0.16	0.16
# Deals	29,421	29,421	29,421	29,421	29,421	29,421
# Startups	18,022	18,022	18,022	18,022	18,022	18,022
# Investment Firms	1670	1670	1670	1670	1670	1670
Observations	903991	903991	903991	903991	903991	903991

Table A.5: Do Investors Tilt their Portfolios Toward Startups from their Alma Mater? (LinkedIn Data)

The tests in this table examine the effect of founders' educational backgrounds on the probability that the founder raises a round of venture capital funding. The table presents OLS regressions run at the investor-startup level. We use the entire LinkedIn database (from Datahut) as of 2017 to select companies formed by founders that attended the schools in our sample. We further restrict the universe to U.S.-based companies formed between 2002 and 2015 that are "Privately Held," and are not missing data on industry, or state where the company is located. Next, we match this set of companies to PitchBook to isolate companies that raised venture capital funding. For companies that raised a venture round, we obtain the alma mater associated with the partners of the lead investor. Next we pair each lead investment firm with all *other* companies in our LinkedIn sample that were formed in the same year, operate in the same industry, and are located in the same state. We assume that these are the set of companies the lead investor potentially *considered* investing in. The dependent variable, *I(Investment)*, is an indicator for whether the lead investor actually invested in the deal. About 2.57% of all investor-startup pairs are actual investments. The key independent variable, *Same Alma Mater*, indicates whether any of the founders share the same alma mater as the partners working for the lead investor. *Mean SAT Score* is the average SAT score at the founder's alma mater in the year the startup was formed (averaged for startups with multiple founders). *Ln(# Founders)* is the log of the number of startup founders. Standard errors are clustered by investment firm.

Dependent Variable:	I(VC Investment)			
	(1)	(2)	(3)	(4)
Same Alma Mater	1.4050***		1.0217***	0.8790***
	(0.1847)		(0.1923)	(0.2318)
Mean SAT Score		0.5950***	0.4736***	0.4432***
		(0.0588)	(0.0609)	(0.0624)
Same Alma Mater x Mean SAT Score				0.2671
				(0.2369)
Ln(# Founders)	2.0940***	2.2376***	2.0924***	2.1131***
	(0.1830)	(0.1831)	(0.1830)	(0.1832)
Adjusted R^2	0.09	0.09	0.09	0.09
# Startups	49,037	49,037	49,037	49,037
Observations	49,037	49,037	49,037	49,037
State x Founding Year x Industry FE x Investor	Yes	Yes	Yes	Yes

Table A.6: College Football wins and Alumni Networks

This table presents regressions examining the effect of college football wins on the likelihood of alumni connections. The tests are conducted at the deal level. The dependent variable is the fraction of founder-investor pairs with school ties. The independent variable captures several measures of the success of the football teams at the founders' alma maters during the current season. Specifically, we calculate the total number of wins in the current season, and the abnormal number of wins relative to past seasons, as a fraction of the number of games played in the season or just the raw number. The sample includes all VC deals from 2010-2019, where at least one founder attended a university with a college football program, and the requisite data are available from PitchBook. Standard errors are clustered by startup.

Dependent Variable:	Same Alma Mater		
	(1)	(2)	(3)
Abnormal FB Wins (N)	0.0278***		
	(0.0027)		
Abnormal FB Wins (%)		0.1461***	
		(0.0165)	
FB Wins (N)			0.0205***
			(0.0023)
# Deals	8,868	8,868	8,868
Adjusted R^2	0.020	0.017	0.016
Observations	8,868	8,868	8,868

Table A.7: How comprehensive is PitchBook's coverage? Evidence from hand collected data on Unicorn Founders.

	Hand Collection	PitchBook Overlap
Unique Companies	518	518
Unique Founders	1,257	1,017
Companies with information on at least one founder	518	464

Table A.8: Characteristics of Startup Firms and Investors for Sample firms in Crunchbase

This table reports summary statistics for startups in our sample split by whether we matched the startup to Crunchbase, another database covering startup financing. Our sample is collected from PitchBook, and is restricted to firms receiving funding from 2000-2020, with founders from U.S. universities, and with the required data for our tests. We match startups in PitchBook to CrunchBase on founding year, state, and then require a 100 percent fuzzy match on the standardized name, which we verify for accuracy. A startup that is matched to Crunchbase is assigned all deals in PitchBook, even though Crunchbase might not cover all the deals PitchBook covers. All continuous variables are winsorized at the 1% and 99% levels to minimize the influence of outliers.

	All startupss (N = 46,466)		**CrunchBase & PitchBook (N = 21,512)**		**PitchBook Only (N = 24,954)**		**Tests**	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Diff	T-stat
Same Alma Mater	0.35	0.48	0.40	0.49	0.32	0.47	0.16	12.90***
Mean SAT Score	1304.24	122.34	1294.99	117.66	1310.28	124.92	-0.13	-8.55***
University Size	2618.39	1763.52	2591.02	1614.47	2636.23	1854.02	-0.03	-1.81*
Young Firm	0.72	0.45	0.66	0.47	0.76	0.43	-0.21	-16.29***
Distance (miles)	755.70	769.44	769.63	738.63	746.62	788.74	0.03	2.30**
Past Funding Relationship	0.38	0.49	0.50	0.50	0.31	0.46	0.40	40.29***
First Funding Round	0.23	0.42	0.18	0.38	0.27	0.45	-0.23	-26.61***
Past Industry Experience	0.96	0.20	0.97	0.16	0.95	0.23	0.13	14.70***
Past Affiliation	0.17	0.37	0.21	0.41	0.14	0.34	0.21	18.29***
# Investors	4.26	3.94	4.57	3.69	4.05	4.08	0.13	11.45***
Outcomes								
IPO	2.83	16.59	4.59	20.93	1.68	12.87	0.18	8.64***
Acquired	8.59	28.02	12.38	32.94	6.12	23.96	0.22	12.83***
Has Patent	25.16	43.39	36.08	48.02	18.05	38.46	0.42	26.15***
Funds Raised ($ Millions)	16.49	63.49	20.58	62.23	13.82	64.16	0.11	8.52***

Table A.9: Characteristics of Startup Firms and Investors for Sample firms in VentureXpert

This table reports summary statistics for startup firms in our sample split by whether we matched the firm to VentureXpert, a widely used database for studies on earlystage funding. Our sample is collected from PitchBook, and is restricted to firms receiving funding from 2000-2020, with founders from U.S. universities, and with the required data for our tests. We match startups in PitchBook to VentureXpert on founding year, state, and then require a 100 percent fuzzy match on the standardized name, which we verify for accuracy. A startup that is matched to VentureXpert is assigned all deals in PitchBook, even though VentureXpert typically has lower deal coverage. All continuous variables are winsorized at the 1% and 99% levels to minimize the influence of outliers.

	All firms (N = 46,466)		**VentureXpert & PitchBook (N = 18,334)**		**PitchBook Only (N = 28,132)**		**Tests**	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Diff	T-stat
Same Alma Matter	0.35	0.48	0.37	0.48	0.33	0.47	0.07	5.64***
Mean SAT Score	1304.24	122.34	1290.49	118.58	1316.11	124.27	-0.21	-15.02***
University Size	2618.39	1763.52	2637.21	1716.98	2602.17	1802.54	0.02	1.44
Young Firm	0.72	0.45	0.72	0.45	0.71	0.45	0.02	1.46
Distance (miles)	755.70	769.44	717.57	753.63	788.57	781.32	-0.09	-7.36***
Past Funding Relationship	0.38	0.49	0.40	0.49	0.37	0.48	0.07	6.92***
First Funding Round	0.23	0.42	0.23	0.42	0.24	0.43	-0.02	-2.57**
Past Industry Experience	0.96	0.20	0.96	0.20	0.96	0.21	0.01	0.83
Past Affiliation	0.17	0.37	0.17	0.38	0.16	0.37	0.03	3.17***
# Investors	4.26	3.94	4.18	3.74	4.32	4.10	-0.03	-3.03***
Outcomes								
IPO	2.83	16.59	3.47	18.30	2.28	14.94	0.07	3.90***
Acquired	8.59	28.02	12.26	32.79	5.43	22.65	0.25	15.08***
Has Patent	25.16	43.39	31.66	46.52	19.56	39.67	0.28	18.51***
Funds Raised ($ Millions)	16.49	63.49	13.45	52.66	19.11	71.42	-0.09	-7.44***

Table A.10: Exit Outcomes of Same Alma Mater Deals (Univariate Analysis)

This table investigates the relationship between same-alma mater deals, exit outcomes of startups, and the quality of universities, where we use the average SAT score of admitted freshmen as a proxy for quality. The unit of observation is a U.S.-based portfolio company that received VC backing. For these schools, we first take the average SAT score between 2000 and 2019 from the College Board. Using these average scores, we categorize schools into four buckets based on their average SAT scores. We then match these schools to our company-level dataset. For each company, we retain the highest-ranking school (by SAT score bucket) that any of the founders attended. For instance, if one founder attended Stanford and the other Southern Methodist University (SMU), we assign that company the average SAT score for Stanford. *Any Success* is an indicator for whether the company was acquired (*Acquisition*) or went public (*IPO*) before the end of our sample, June 2021. *Failure* is an indicator for instances where PitchBook classifies the company as "Out of Business," "Bankruptcy: Liquidation," or "Bankruptcy: Admin/Reorg." For each SAT score bucket, we report the average number of company exits in each exit type for unconnected and connected deals, with the connected deal statistics reported in parentheses.

SAT score sort Outcomes	[1600 to 1400)	[1400 to 1200)	[1200 to 1000)	[1000 and below]
IPO	3.55% (7.75%)	3.55% (6.48%)	2.46% (7.53%)	1.56% (3.33%)
Acquisition	23.68% (25.69%)	25.26% (26.70%)	24.79% (27.39%)	25.00% (16.67%)
Failure	9.16% (7.27%)	9.73% (9.49%)	11.94% (7.53%)	10.15% (10.00%)
Any Success	27.24% (33.45%)	28.82% (33.18%)	27.25% (34.93%)	26.56% (20.00%)

Table A.11: Connections, School Quality, and Exit via Acquisition

The tests in this table examine the effect of school ties between founders and investors on the probability of an Acquisition post-funding. The table presents coefficients from OLS regressions run investor-startup level, with standard errors reported in parentheses. We keep the first investment by the lead investor in the startup and track whether the investment exits via an acquisition following the initial investment. We focus on early-stage equity financing deals from 2000-2016, where the requisite data is available from PitchBook. We end the sample in 2016 to allow enough time for an exit. The dependent variable is an indicator for whether the startup in the deal eventually exits via an acquisition by June 2021. The key independent variable, *Same Alma Mater*, indicates whether any of the founders share the same alma mater as an investor in the deal. *Mean SAT Score* is the average SAT score at the founder's alma mater in the year the startup raised funding (averaged for startups with multiple founders). *Ln(Funding Raised FD)* is the amount of funding the startup raised from the lead investor in the first funding round. Compared to Table 7, this table is missing the control for *Past Funding Relationship* because this variable are not defined for an investor's first financing of the startup. We cluster standard errors by investment firm.

Panel A. Investor-Deal Level Tests					
Dependent Variable:	I(Acquisition)				
	(1)	(2)	(3)	(4)	(5)
Same Alma Mater	2.5675***	-0.3167	0.6291	2.4202	1.8650
	(0.5985)	(0.9354)	(1.0419)	(1.9697)	(1.8213)
Mean SAT Score	0.6265**	-0.9671	-0.8465	-0.8959*	-0.8665*
	(0.2954)	(0.5912)	(0.5246)	(0.5248)	(0.5247)
Same Alma Mater x Mean SAT Score		0.3421			
		(0.9968)			
I(Overlapping Graduation)			-2.8326**		
			(1.3167)		
I(Same School)				-3.2439	
				(2.0140)	
I(MBA)					-2.7051
					(1.8732)
Ln(Investors Alma Mater)	0.0090	-1.3276**	-1.3335**	-1.3267**	-1.3377**
	(0.2868)	(0.5312)	(0.5308)	(0.5309)	(0.5311)
Young Firm	0.1193	1.4005	1.3783	1.3894	1.3882
	(0.7309)	(1.0277)	(1.0275)	(1.0272)	(1.0274)
Ln(distance)	-0.3194	0.2025	0.1897	0.1976	0.1996
	(0.2670)	(0.4142)	(0.4140)	(0.4140)	(0.4141)
I(Seed Round)	1.6391***	-0.9811	-1.0236	-0.9840	-1.0125
	(0.5336)	(1.1947)	(1.1946)	(1.1957)	(1.1958)
Past Affiliation	-0.0405	0.3013***	0.3073***	0.3019***	0.3024***
	(0.0572)	(0.1089)	(0.1086)	(0.1087)	(0.1088)
Ln(Funding Raised FD)	3.2411***	2.5149***	2.5741***	2.5194***	2.5175***
	(0.3070)	(0.3810)	(0.3812)	(0.3807)	(0.3811)
Investor FE	Yes	Yes	Yes	Yes	Yes
First Deal Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.08	0.08	0.08	0.08	0.08
# Startups	7110	7110	7110	7110	7110
# Investors	857	857	857	857	857
Observations	10012	10012	10012	10012	10012

(Table A.11 Continued)

Panel B. Startup Level Tests					
Dependent Variable:	I(Acquisition)				
	(1)	(2)	(3)	(4)	(5)
Same Alma Mater	1.8000*	1.8147*	2.2426*	2.5097	1.7290
	(1.0189)	(1.0301)	(1.1624)	(2.2676)	(1.9494)
Mean SAT Score	-0.2904	-0.3108	-0.2779	-0.2970	-0.2904
	(0.5575)	(0.6127)	(0.5579)	(0.5580)	(0.5575)
Same Alma Mater x Mean SAT Score		0.0758			
		(1.1156)			
I(Overlapping Graduation)			-1.3057		
			(1.5746)		
I(Same School)				-0.8121	
				(2.3150)	
I(MBA)					0.0844
					(2.0255)
Ln(University Size)	-0.4783	-0.4754	-0.4801	-0.4769	-0.4780
	(0.5702)	(0.5702)	(0.5702)	(0.5700)	(0.5704)
Young Firm	2.2631*	2.2612*	2.2669*	2.2651*	2.2620*
	(1.2109)	(1.2114)	(1.2108)	(1.2114)	(1.2123)
Ln(distance)	0.6679	0.6672	0.6674	0.6663	0.6680
	(0.4233)	(0.4234)	(0.4232)	(0.4233)	(0.4233)
I(Seed Round)	0.0739	0.0713	0.0526	0.0669	0.0755
	(1.1910)	(1.1903)	(1.1910)	(1.1927)	(1.1909)
Past Affiliation	0.2488**	0.2488**	0.2528**	0.2498**	0.2486**
	(0.1030)	(0.1030)	(0.1030)	(0.1030)	(0.1030)
Ln(Funding FD)	3.1377***	3.1371***	3.1563***	3.1362***	3.1377***
	(0.3547)	(0.3547)	(0.3555)	(0.3548)	(0.3547)
State x Year x Industry FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.03	0.03	0.03	0.03	0.03
# Startups	6736	6736	6736	6736	6736
Observations	6736	6736	6736	6736	6736

Table A.12: Selection or Treatment?

The tests in this table examines the relationship between a partner's departure from an investment firm and the likelihood that a company funded by the investment firm exits via in initial public offering (IPO). The table presents OLS regressions run at the startup level. The dependent variable, *I(IPO)*, is an indicator for whether the startup exits via an IPO by June 2021. The key independent variable, *I(Partner Departure)*, indicates whether the departing partner *from the same alma mater as the founder* left the investment firm three years or fewer following the investment but before the exit date or June 2021. *SAT Score* is the SAT score of entering freshmen at the alma mater in a given year. Standard errors are clustered by investment firm.

Dependent Variable:	I(IPO)			
	(1)	(2)	(3)	(4)
Same Alma Mater	3.5757***	3.3847***	2.0619***	2.0638***
	(0.7159)	(0.7369)	(0.7223)	(0.7214)
Same Alma Mater X Partner Departure	-1.9674	-1.9773	-1.2537	-1.4820
	(4.7254)	(4.7309)	(4.6882)	(4.6891)
Partner Departure	0.5585	0.5456	-1.4948	-1.3654
	(3.5356)	(3.5452)	(3.5480)	(3.5279)
Mean SAT Score		0.4054	0.6856**	0.8428**
		(0.3421)	(0.3404)	(0.3573)
Ln(Funding FD)			3.1338***	3.3351***
			(0.2802)	(0.3164)
State x Year x Industry FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.10	0.10	0.12	0.12
# Firms	6736	6736	6736	6736
Observations	6736	6736	6736	6736
Other Controls?	No	No	No	Yes

Table A.13: Characteristics of Universities with Legacy admissions

This table shows the characteristics of students attending the universities attended by the founders in our sample, split by whether the university considers legacy admissions. *P(White)*, *P(Asian)*, *P(Hispanic)*, and *P(Black)* are the proportions of undergraduate students at the university that are White, Asian, Black, and Hispanic respectively. *SAT Score* refers to the average SAT score of entering freshmen at the university over our sample period, *University Size* is the average number of undergraduate students attending the university, *Admission Rate* is the average admissions rate for the university and *I(Public School)* is an indicator for a public university. For the Legacy sample (Universities that consider Legacy in their admissions process), N = 146 and for the Non-Legacy sample (Universities that do not consider Legacy in their admissions process), N = 339.

	2003 to 2008 (N = 485)				**2016 to 2021 (N = 485)**			
	Full Sample	Legacy Sample	Non Legacy Sample	t-stat	Full Sample	Legacy Sample	Non Legacy Sample	t-stat
P(White)	0.59	0.58	0.59	-0.33	0.59	0.58	0.59	-0.59
P(Asian)	0.05	0.06	0.05	1.49	0.07	0.09	0.07	2.23**
P(Hispanic)	0.05	0.05	0.06	-1.93*	0.13	0.11	0.13	-2.49**
P(Black)	0.06	0.05	0.07	-1.37	0.09	0.08	0.09	-0.56
I(Public University)	0.44	0.16	0.55	-9.16***	0.51	0.24	0.58	-6.18***
University Size	8960.13	6089.50	10038.69	-5.35***	11304.23	9452.92	11786.15	-1.95*
Average SAT	1135.24	1240.33	1095.75	12.94***	1201.82	1311.24	1173.34	9.51***
Admission Rate	0.63	0.52	0.68	-8.66***	0.65	0.50	0.69	-6.50***
Pell Grant	0.20	0.15	0.22	-9.02***	0.28	0.20	0.30	-8.63***
First Generation	0.29	0.20	0.33	-14.62***	0.28	0.20	0.30	-10.50***
Income	73944.34	85671.98	69538.01	11.47***	85164.13	103227.79	80461.84	8.49***