Firm Decisions and Variation in the Returns to College: Evidence from Employer Recruiting*

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Abstract

I analyze how employer decisions affect university variation in graduates' labor market opportunities. I collect office locations and campus recruiting strategies for over 70 banking and consulting firms, from 2000 to 2013. After firms open an office, students at nearby universities are twice as likely to have on-campus access to the firm. After closing an office, previously nearby universities are one-seventh as likely to have access. An additional firm recruiting on campus, after opening a nearby office, raises the likelihood of top 1% earnings by 1.35 percentage points (20%) at age 30-34, for students in the bottom parental income quintile.

Intergenerational income mobility varies greatly across the United States (Chetty et al. 2014), as well as across universities (Chetty et al. 2017). Understanding why post-university upward income mobility is higher for some universities than for others remains an important and underexplored area for research and policy.

This paper argues that employers often begin recruiting from a particular university because of firm-level geographic changes, exogenous to the university. These employer decisions cause variation across universities in access to firms, returns to college, and graduates' income mobility. Consider the following case studies, in which arguably exogenous firm-level

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geographic changes affect the jobs students obtain upon college graduation. Huron Consulting Group opened a Detroit office in 2007. In the five years before opening the Detroit office, Huron hired no more than two students per year from the University of Michigan Ross School of Business.[1] In the first two years after opening the Detroit office, Huron hired six to seven undergraduate students from this business school.

In 2004 JP Morgan Chase dramatically increased its presence in Columbus, Ohio after merging with Bank One, which had large Columbus operations.[2] In the four years preceding the merger, JP Morgan Chase hired four to six undergraduate students from Ohio State University's Fisher College of Business. In the year of the merger they hired nine students. By three years after the merger they hired 16 students, by five years after the merger they hired 37, and by 2017 they hired 68 students, far greater than the previous Bank One hires.

Because of arguably exogenous changes in office locations, students at University of Michigan and Ohio State were more likely to obtain very high-wage jobs at two prestigious companies. If these universities' supply of talented labor exceeded high-wage firms' demand for their students, changes at these two firms would affect the universities' post-graduation salaries. If these firms hired students from lower parental income quintiles, these changes may also affect rates of upward income mobility.

Increasing hires from these universities may reflect a change in recruiting strategies after increasing local presence. Many employers, including finance and consulting firms, hire entry-level college-educated workers by targeting particular universities, and conducting recruiting events and interviews on campus.[3] In a recent survey of 275 firms across many industries, over 75% conducted on-campus interviews, and nearly 60% of full-time entry-level college hires were initially interviewed on campus (National Association of Colleges and Employers 2014). Students at nontargeted campuses may generally apply, but they have less access than students at targeted campuses.

This paper studies whether firm-level geographic changes, arguably exogenous to the universities, affects recruiting decisions for high-wage entry-level finance and consulting jobs. I focus on how and why campus recruiting decisions change when firms add or close offices. I then present evidence showing how these recruiting decisions affect earnings and upward income mobility of a university's graduates using the *mobility report card* data (Chetty et al. 2017).

[1] Its previously closest office had been in Chicago. See end of paper for comparison to control firms.

[2] Up until 1998, the headquarters for Bank One was in Columbus and so its presence there was quite large even after it moved its headquarters to Chicago.

[3] Based on interviews with career services personnel and employees at consulting firms (former and current), Weinstein (2018) describes the campus recruiting labor market for undergraduates, specifically for finance and consulting firms. Rivera (2011, 2012) studies hiring processes of professional services firms based on interviews and observation of a hiring committee.

Using the *Internet Archive: Wayback Machine*, I assemble a new dataset of office locations and campus recruiting strategies for over 70 of the most prestigious finance and consulting firms at over 360 universities from 2000-2013.

The recruiting decisions of prestigious finance and consulting firms are particularly important for understanding upward income mobility. Based on the 2017 ACS, 23-25 year old college graduates working full-time as management analysts in consulting firms or as financial analysts in finance firms earned median wages of roughly $70,000, relative to $40,000 for the same sample working in any occupation or industry (Ruggles et al. 2019).[4] By 30-34 years old, these salary differentials are even greater with the median financial analyst earning $130,000, the median management analyst earning $100,000, and the median college graduate earning $61,000.

I argue that I identify the impact of employers' geographic location decisions exogenous to local university characteristics. First, I control for overall changes in university attractiveness and firm demand using data on many firms' recruiting at a given university and a given firm's recruiting at many universities. For example, I compare a firm's recruiting at a given university after opening a nearby office to changes in other firms' recruiting at the same university that do not experience changes in firm-university distance. I also show the scale of hiring by these firms is likely not large enough to justify opening an office for the purpose of recruiting. Industry accounts suggest new office locations for management consulting firms are based on client needs (Greiner and Malernee 2018).

Specifically, I estimate event-study regressions, identifying changes in recruiting within a firm-university pair when the distance between that pair changes. Including firm-university, firm-year, and university-year fixed effects effectively yields a triple-difference estimate. I compare the likelihood that university j attracts firm k before and after firm k opens a nearby office, to the change in other firms' recruiting at university j, where there is no change in firm-university distance. I also compare this change to changes in firm k's recruiting at universities where there is no change in firm-university distance. Key to the identification is that timed with the move, the university does not become more attractive to the moving firm relative to other similar firms, for reasons other than the reduction in distance.

Firms' decisions about office locations affect which universities have increased access to their job opportunities. I find firms are nearly twice as likely (.8 percentage points) to recruit at a university in the four years after they open a nearby office, relative to the years before

[4]Sample includes employed workers, working for wages, usually working at least 40 hours per week, and working at least 48 weeks per year. There were 117 individuals in the ACS working as management analysts in consulting firms (management, scientific and technical consulting services) among this sample. There were 68 individuals working as financial analysts in finance firms (banking and related activities, or securities, commodities, funds, trusts, and other financial investments) among this sample.

the move. The recruiting probability remains similarly elevated five or more years after the move. Firms do not increase recruiting prior to the move, suggesting new office locations are not driven by recruiting relationships. For the four years after firms close local offices, recruiting at local universities falls by .7 percentage points, or one third. Five or more years after moving away from the university, the likelihood of recruiting falls to about 14% of the pre-move likelihood.

Adjusting recruiting after geographic changes has implications for the size of labor market frictions and how firms value different factors in recruiting. When a firm opens a new office, there is a tradeoff from recruiting at a new set of target campuses in this local market. Students at these universities have revealed some geographic preference for the city. If applicants have migration frictions, local recruiting will yield fewer rejected offers due to location preferences. This may also give the firm monopsony power and allow it to pay lower wages. Local recruiting will also save the firm monetary and opportunity costs from recruiting for this new location at their further-away existing target campuses.

These explanations are consistent with limited and declining interstate migration for college-educated individuals and those who are 18-24 years old (Molloy, Smith, and Wozniak (2011)). Further, only 16% of students attend a college or university in a state that did not share a border with their home state (Mattern and Wyatt 2009), consistent with the location preferences explanation.[5]

However, firms may find it beneficial to fill their new office vacancies by recruiting at existing target campuses, rather than adding new targets. Recruiting experience at a university may improve the quality of the firm's applicant screening or improve applicants' information about the firm, yielding more applicants and better hires. This may be amplified by alumni networks at existing target universities, which may affect screening, hiring yield, or complementarities in production.[6]

The costs of distance appear large based on the rapid decay of these effects with distance, for Ivy Plus and elite universities (Barron's Tier 1 universities). There are large increases in recruiting for these universities, if they are within 10 miles of the new office. The effects are much smaller or nonexistent for universities in the same tier further than 10 miles. There is some evidence that firms are willing to sacrifice selectivity to recruit at closer universities. Additionally, new targets in smaller markets are much less selective than the firm's median target campus. Second, costs of distance appear large because relatively small distances keep firms from recruiting at campuses we know they target when they are even closer.

[5]The sample is from the College Board, and includes over 900,000 college-bound seniors in 1999 who study at a four-year university.

[6]See Ioannides and Loury 2004 and Topa 2011 for a review of the literature on networks in labor markets. Burks et al. 2015 show benefits of hiring through referrals.

Third, firms are willing to substitute to campuses adjacent to their new office and away from relatively nearby campuses where they have recruiting experience. While the results suggest firms value proximity, it is also strikingly clear that conditional on proximity firms value university selectivity. Ivy Plus universities benefit most from these new offices. The results suggest firms also value attributes other than proximity and selectivity.

Changes in recruiting for relatively small changes in distance suggests applicant migration frictions are not the underlying mechanism. Firms are unlikely concerned that applicants would reject offers to work at very nearby locations. Instead, sensitivity to distance arguably comes from employer costs that increase in distance, including opportunity costs of time. These opportunity costs may be quite substantial in finance and consulting. Recruiting is often conducted by bankers and consultants with high external billing rates.

To evaluate the earnings impact of elite firm recruiting, I use the *mobility report card* by university and birth cohort from Chetty et al. (2017), obtained from federal tax records. I focus on the probability that the university's students reach the top 1% and the top 20% of earnings for their birth cohort by 2014, conditional on parents' income quintile. If a 22 year-old-student has access to an additional firm recruiting at their university after it opens a nearby office, this raises the likelihood of top 1% earnings at 30-34 by approximately 1.35 percentage points or 20%, for students with parents in the bottom income quintile. This is four times larger than the effect for students with parental income in the top quintile. The increase is relative to the increase at other universities in the same commuting zone (CZ).

I further complement the recruiting data with data on hires by firm from annual reports of two business schools. Using the two case studies above, I show hires are sensitive to proximity, comparing Huron and JP Morgan Chase hires to hires by other firms in the same industry.

I present several additional tests to address whether these firms open offices for the purpose of recruiting. Further, I show the results do not appear driven by the alma mater of the employees sent to open new offices, based on *LinkedIn* data for office "founders".

This paper contributes to our understanding of who has access to high-wage jobs, and suggests employer decisions affect the value and distribution of the returns to college. The results imply that one dimension of a university's value added is the set of firms to which the university enables access.[7] The evidence that firms are willing to sacrifice university selectivity to recruit at closer universities suggests prospective students might consider this dimension when choosing a university, in addition to educational value added.[8]

[7]The relationship between universities and local employers is consistent with recent findings that college major and enrollment are affected by local economic conditions (Cascio and Narayan 2015, Charles, Hurst, and Notowidigdo 2018, Weinstein 2019).

[8]Macleod and Urquiola (forthcoming) show theoretically that in a competitive labor market households

In studying the relationship between university and access to the business elite, the paper complements Zimmerman (forthcoming), who finds admission into elite university programs in Chile affects attainment of top jobs and incomes. MacLeod et al. (2017) find that earnings growth is positively correlated with university reputation. Weinstein (2018) shows recruiting for high-wage jobs and wages depend on a university's regional rank, conditional on absolute university quality, using cross-sectional data. Previous qualitative evidence has suggested elite professional firms rely heavily on elite networks (Gellman 2016; Rivera 2011).[9] I show these firms also recruit at less selective universities in close proximity to their offices.

The paper also contributes to several literatures studying the impact of distance to economic opportunity on labor market outcomes. This includes the impact of individuals moving to lower-poverty areas (Chetty, Hendren, and Katz 2015, Kling, Liebman, and Katz 2007, Oreopolous 2003), as well as the impact of policies attracting firms to local jurisdictions (see Neumark and Simpson 2015 for a review).[10] I build on these literatures in several ways.

First, I show the geography of an individual's university has a causal impact on access to jobs. Chetty and Hendren (2016) show the causal effect of geography earlier in life, childhood neighborhood, on later earnings does not operate through this job access mechanism. Second, the place-based policies literature has focused on the manufacturing and energy sectors. Higher-wage services industries are also important targets for local jurisdictions (Story, Fehr, and Watkins 2012), and I show distance affects access to these firms.

Finally, I study employers' choice of where to recruit workers. This contrasts with the related literature, typically using individual or aggregate employment and earnings data, or focusing on the individual's job search. Manning and Petrongolo (2017), as well as Marinescu and Rathelot (2018) find applicants are less attracted to jobs as distance from their home location increases, which may increase firms' monopsony power. There is a lack of evidence showing how employers value geographic distance in their recruiting and the impact on worker outcomes.

Recent work by Oyer and Schaefer (2016) also studies the role of geography in hiring. Their focus is on the matching between US law firms and law school students, using a unique dataset of lawyer biographies. Similar to this paper, they show closer geographic proximity to a given law school implies the firm is more likely to hire its graduates. I build on their paper by using panel rather than cross-sectional data, allowing me to study how firm choices

will often prefer high-absolute achievement schools over those with high value added.

[9]Based on employer interviews and observations of a hiring committee, Rivera (2011) finds elite services sector employers rely heavily on elite universities for recruiting. She also finds geographic proximity could influence which universities were target campuses.

[10]This is related to the spatial mismatch literature, focusing on whether blacks in US cities experience poor labor market outcomes because of distance to jobs for lower-skilled workers in the suburbs (Kain 1968, see Gobillon, Selod, and Zenou 2007 for a review).

affect the value and distribution of the returns to college.

1 Data

I collect a rich and unique panel dataset of locations and recruiting strategies using *The Internet Archive: Wayback Machine*. I focus on the 50 most prestigious consulting and banking firms as ranked by Vault in 2007 and 2008, respectively.[11]

For these ranked firms, I identified whether the firm's website in the Fall of each year contained information on their office locations and undergraduate target campuses, for 2000 through 2013.[12] I denote whether a firm (f) recruits at a given university (j) in a given year (t) ($Recruit_{fjt}$), for each university in Princeton Review's *The Best 376 Colleges* (2012).[13] Figure 1 gives an example of this data collection process for the consulting firm Bain & Company in 2001.

For each firm/university pair, in each year I identify the office location with the shortest distance to the university using coordinates.[14] I define a move in as an instance in which a firm moves at least 50 miles closer to a university, and is within 200 miles, and a move out as a firm moving at least 50 miles farther from a university when it had been within 200 miles.

I drop singletons: firm/university pairs only in the sample for one year, and firm/year pairs with only one observation in the sample (after dropping firm/university pairs that are singletons).

The *Wayback Machine* and Employer Recruiting Strategies

The *Wayback Machine,* made available by the non-profit organization Internet Archive, was started in 1996 as an archive of the internet constructed by automated systems routinely crawling the web. It contains 279 billion web pages (Internet Archive 2017). While the archive contains recruiting and location pages for many firms in the sample, not all pages are archived. Either the automated web crawlers were not aware of the site's existence at

[11] The 2007 ranking of banking firms contained very few firms.

[12] This data collection was done manually for consulting firm locations and recruiting strategies of banking and consulting firms. For banking firm locations, we wrote a program to download webpages containing office locations for firms in the sample (using the API of the Wayback Machine to identify which webpages to download). We then read the locations from the downloaded pages.

[13] I exclude universities without IPEDS data and test scores, foreign universities, and service academies. I create one observation for the five Claremont Colleges. By focusing only on universities listed in the Princeton Review, I do not capture the universities outside this list where the firm may recruit. Recruiting at these less selective universities may be more likely driven by geographic proximity, which suggests the effects I report are underestimates.

[14] I compute the lengths of the great circle arcs connecting each university and each office location for a given firm, located on the surface of a sphere. I use driving distances for robustness.

the time of the crawl, or the site blocked access to automated web crawlers. I code *Recruit* as missing for all of these nonarchived pages. However, the page may not have been archived because it did not exist. This may suggest there was no active recruiting that year.[15]

In addition to some firms having unarchived or broken location pages, there is some variation within firms across years in the types of locations they report. This variation due to reporting could lead to mistakenly coding office openings and closings. I code location as missing for firm/years in which the reporting of locations appears inconsistent with other years.[16]

The final dataset contains 42 consulting firms and 31 banking firms. I obtain the latitude and longitude of the office locations using the Census Gazetteer place and county subdivision files. For cities that could not be merged, I manually obtained the latitude and longitude. I merge the recruiting data with university-level characteristics from IPEDS, including the university's latitude and longitude.

New office locations may result from mergers or acquisitions. New target campuses timed with these new locations may be the original targets of the acquired or merging firm. However, the decision to keep the target campuses of the acquired/merging firm continues to suggest the importance of distance between the sample firm and the university. When merging or acquiring new businesses, the firms in my sample continue to have a decision about whether to update their target campuses. In particular, they could decide to abandon the recruiting strategies of the firm they acquired/merged with, and instead apply their own recruiting strategies. As a result, even if new target campuses are original targets for acquired/merging firms, keeping these targets suggests a relationship between recruiting and geography. If the acquiring firm is larger or more prestigious this may also reflect an important change in job opportunities.

Summary Statistics

Of the 73 firms, Table 1 shows 51 open offices in 190 cities, affecting 359 of 362 universities, and 3454 firm/university pairs (13.4%).

Forty-two firms in the sample close offices in 85 cities, affecting 349 universities, and 1936 firm/university pairs (7.7%). Cities experiencing move ins and move outs are distributed across the country, as are universities in the sample (Figure 2). Appendix Figure A2 shows that move ins are distributed across years in the sample, though move outs appear more likely after the Great Recession.

[15] Appendix Figure A1 shows the number of observations for which the recruiting page was not archived, for reasons other than being blocked or nonworking links, increases dramatically from 2008-2011. This suggests nonarchived pages may be related to the recession, and signify an absence of active recruiting.

[16] Details are available in the data files.

2 Empirical Strategy

To measure the effect of move ins, I estimate the following event-study regression:

$$Recruit_{fjt} = \alpha_0 + \alpha_{fj} + \delta_{ft} + \kappa_{jt} + \sum_{k=k_{min}}^{k_{max}} \beta_k I(t = t^* + k) MoveIn_{fj} + \epsilon_{fjt} \quad (1)$$

I estimate the analogous regression for move outs. The variable $Recruit_{fjt}$ is an indicator equal to one if firm f recruits at university j in year t. I include firm/university fixed effects (α_{fj}) which ensures that I identify changes in recruiting within a firm/university pair when the closest office changes for that pair.

The variable $MoveIn_{fj}$ is an indicator for whether firm f moved at least 50 miles closer to university j at t^*, and is within 200 miles. The variable is zero for firm/university pairs that never experience a move in. I restrict to the first move in, and the years associated with it. For example, I exclude years after any subsequent move and before any previous move out. I estimate an analogous regression for move outs, where $MoveOut_{fj}$ is an indicator for firm f moving at least 50 miles farther from university j in t^*, and it had previously been within 200 miles of university j.

Each coefficient β_k measures the change in the probability that firm f recruits at university j in the k^{th} year relative to the move, relative to the year preceding the move. I censor $|t - t^*|$ at five. The estimates of β when $k < 0$ identify whether there were increases in the probability of recruiting in the years preceding the move in. If these coefficients are small and insignificant from zero, this suggests recruiting decisions are not driving location decisions. However, for firms closing offices, we may expect changes in recruiting before the closing if the firm's office is underperforming.

The central identification assumption is that a firm's recruiting at a university would not have changed for other reasons timed with the move. For example, opening an office close to a given university could have been timed with an overall increase in recruiting for the specific firm, or with an overall increase in recruiting firms at this specific university. To control for these possibilities, I include firm-year and university-year fixed effects in (1).[17] This effectively yields a triple difference estimate. The effect of an office closing on recruiting is any difference beyond average changes in recruiting for the firm and university that year, for example due to a recession or university changes making it more attractive to firms. I estimate the specification with standard errors clustered at the firm level since these are larger than those obtained by clustering at other levels.[18]

[17] Given the large number of fixed effects this adds to the regression, I estimate this specification on a server, with higher processing and memory capabilities, using the *reghdfe* command in Stata (Correia 2016).

[18] These are larger than standard errors clustered at the firm/university level, the firm level, the university

I also show regression results from a similar specification that groups years into short-run (zero through four years after the move) and long-run (five or more years after the move):

$$Recruit_{fjt} = \alpha_0 + \alpha_{fj} + \delta_{ft} + \kappa_{jt} + \beta_1 PostSR_{fjt} + \beta_2 PostLR_{fjt} + \epsilon_{fjt} \quad (2)$$

3 Results

In the year a firm opens an office close to a university, students at the university are .5 percentage points more likely to have on-campus access to the firm, relative to the year before (Figure 3a). This effect increases to 1.2 percentage points by the year after the move. The probability remains similarly elevated in the subsequent years, although by four or more years after the move the magnitude falls slightly. However, fewer pairs have data four or more years after the move, so precision falls as well. The mean of the dependent variable is .008 in pre-move years among firm/university pairs that experience move ins. This suggests that when a firm opens an office close to a university, the university's students are nearly twice as likely to have on-campus access to the firm relative to before the move. There is no evidence that firms are increasingly likely to recruit at the university preceding the move.

Not all firm/university pairs have data in each of the year bins before and after the policy (Appendix Table A2). I test whether the increase between $t = t^*$ and $t = t^* + 1$ is simply because of the change in composition of the firm/university pairs with data in $t = t^* + 1$. I estimate the regression including only firm/university pairs with data at least in $t = t^* - 1$, t^*, and $t^* + 1$, as well as the pairs that never experience move ins. This decreases the number of pairs experiencing move ins and as a result the precision. The coefficient on $t = t^*$ is .003 (not significant) and the coefficient on $t = t^* + 1$ is 3 times as large with a magnitude of .01 ($p \leq .01$).

Figure 3b shows that firms do not immediately drop target campuses after closing local offices. However, by three years after closing their nearest office to the university, firms are 1 percentage points less likely to recruit ($p = .06$). Five or more years after closing their nearest office, firms are 1.8 percentage points less likely to recruit, relative to the year before the move ($p \leq .05$). The mean of the dependent variable is .021 in pre-move years among firm/university pairs that experience move outs. This suggests that when a firm leaves the market, the probability of recruiting at universities in the market falls over 85%.

This effect is not driven by differential selection of firms with data five or more years after the move out. I estimate the specification including only firm/university pairs with data in $t = t^* + 5^+$, and there is still a much larger effect five or more years after the move relative to

level, the firm/year level, the university/year level, and unclustered but robust to heteroskedasticity.

immediately afterwards. There is some suggestive evidence that the firm reduces recruiting at local universities in the year prior to closing the local office. This does not appear to be part of a much longer trend, and it is weaker in the years immediately after the closing. This may reflect the firm knew they would be closing the office, or that the office had declined in productivity in recent years and thus local recruiting fell. It seems unlikely that the firm would close their office because they had stopped recruiting at a university, but this will be addressed in a later section.

Table 2 shows similar regression results from specification (2), grouping years into pre-move years, post-move short-run years and post-move long-run years.

Interestingly, the results suggest banks and consulting firms are similarly likely to adjust recruiting in the long run after move ins, but that banks are slower to adjust recruiting in the short run (Appendix Table A3). However, the differences are generally not statistically significant. There are no statistically significant differences when estimating the specification separately for the highest-ten-ranked banking and consulting firms in the sample, and separately for the less prestigious firms. Interestingly, the long-run effects are larger in magnitude for the higher-ranked firms.[19] There are no statistically significant differences when the firm opens or closes an office in a larger city (Appendix Table A6).

Appendix Figure A3(a) shows the universities that began attracting a recruiting firm after it opened a nearby office, but never attracted this firm preceding the move. These universities are distributed across the country, with many in areas other than the largest U.S. cities. Comparing this to Figure 2, there are still many universities in areas receiving new firms that do not attract these firms after the move. This is consistent with the low baseline probability of attracting one of these firms. Appendix Figure A3(b) shows universities that had attracted firms at least once before an office closing, but did not attract them at least once after the firm closed the local office.

4 What Distance is too Costly, and What do Firms Sacrifice for Proximity?

The previous section showed that employers' office location decisions affect which universities have greater access to their jobs based on campus recruiting activity. I next study how and why firms value proximity in recruiting. Whether firms are willing to tradeoff positive

[19]Including the highest-ten-ranked firms in the sample implies I include ranks worse than 10 because of firms with missing data. Limiting the regressions to the top ten ranked firms by Vault reduces the sample, but generally yields similar magnitudes and no statistically significant differences in the effects for high- and low-ranked firms. Booz & Company is not included in the regressions by rank because it spun off one of the original Vault-listed firms.

university attributes, such as selectivity and experience recruiting at the university, in order to recruit nearby will depend on various parameters: the cost of recruiting at a university without the positive attribute (e.g. costlier screening or less productive hires) and the cost of recruiting further away due to travel and applicant migration frictions. If nongeographic attributes significantly reduce the cost or raise the benefit of recruiting, target campuses should be less sensitive to geographic distance. If geographic costs are important, firms will sacrifice other positive attributes in order to recruit nearby.

Understanding how firms value geographic distance relative to other attributes is important for several reasons. First, it helps clarify who benefits from nearby economic activity, and how close they must be to benefit. Second, it helps clarify whether firms would experience productivity gains if there were decreases in geographic search costs, applicant migration frictions, or screening costs.

I analyze the extent to which firms value geographic distance relative to other attributes with several reduced-form tests. A structural model would allow for estimating these parameters more directly and performing counterfactuals. However, the reduced-form tests provide important evidence on what firms value in recruiting.

First, I test how the effects of an office opening decay with distance between the firm and university after the move, controlling for university selectivity. Specifically, I analyze how the effect of moving within various radii varies by university selectivity tier (classified as in Chetty et al. 2017): Ivy Plus (Ivy League plus Stanford, MIT, University of Chicago, and Duke), elite (Barron's Tier 1 excluding Ivy Plus), highly selective and selective (Barron's Tiers 2 through 5), and nonselective or not enough information (Barron's Tier 9 and outside Barron's index). I estimate:

$$\begin{aligned} Recruit_{fjt} = \alpha_0 + \alpha_{fj} + \delta_{ft} + \kappa_{jt} + \beta_r Post\_r_{fjt} \\ + \gamma_{r,s} Post\_r_{fjt} * Tier\_s_j + \epsilon_{fjt} \end{aligned} \tag{3}$$

The variable $Post\_r$ is an indicator for whether firm f has moved at least 50 miles closer and is within radius r of university j by year t, where radius
$r \in \{[0, 10), [10, 25), [25, 50), [50, 100), [100, 200]\}$, and tier s includes Ivy Plus, Elite, Highly Selective/Selective, and Non Selective/Insufficient Information.[20] Because there were not dramatic differences in short- and long-run effects shown in Figure 3, for simplicity I include only an indicator for the years following a move. One concern is that when firms open offices

[20]There is one nonselective college in the sample, and 11 with insufficient information. I do not show effects for these universities, but there are only two observations from this tier which have $Recruit = 1$.

within 10 miles of an Ivy-Plus university, those offices might be in quite different types of locations than those opening offices within 10 miles of other universities. I include firm-urban area of closest office-year fixed effects to compare the effect of a move for universities of different tiers, conditional on the new office location.[21]

Decay with Firm-University Distance for Universities within 200 Miles There is considerable variation in firm-university distance after the move (Figure 4a). While the highest proportion of post-move distances are within 0 to 10 miles of the university (over 15%), nearly 10% of the moves are within 10 to 20 miles of the university and over 5% are within 20 to 30 miles. This allows for comparing moves adjacent to universities to those only slightly farther away.

There are three important findings in Figure 4b, which shows the linear combination of the β and γ coefficients in regression (3). First, conditional on selectivity, firms highly value proximity. Firms significantly increase recruiting at Ivy Plus and elite universities within 10 miles, with much smaller or nonexistent effects farther away. For Ivy Plus universities there is a 23.9 percentage point increase in the likelihood of attracting a firm (Table 3, column 3). The pre-move likelihood of attracting a recruiting firm was 6.7%, implying the likelihood is 4.5 times higher after the move. The percentage point increase for Ivy Plus universities is statistically significantly larger than for elite and highly selective and selective universities. For elite universities, the magnitude suggests a 3.7 percentage point increase in the likelihood of attracting a recruiting firm. The pre-move likelihood was 2.2%, implying the likelihood is 2.7 times higher after the move. While this effect is large, we also cannot reject that it is zero.

The effects decay quite rapidly with distance within the two more selective tiers. The effects for universities farther than 10 miles are substantially smaller in magnitude, or nonexistent.[22] This may reflect significant costs of recruiting slightly further away. Alternatively, it could be explained by the absence within selectivity tier of similarly selective universities in further radii. This will be explored below with some illustrative examples. Appendix Table A9 shows similar decay using a polynomial in post-move distance and a continuous

[21] I obtain the urban area corresponding to each city by first merging the city to a census place or county subdivision using the TIGERweb data files from the US Census to obtain the geoid, and then merging on geoid to the Urban Area Relationship Files from the US Census.

[22] Appendix Figure A6 shows similar results using driving distances from Google Maps for a subset of pairs rather than distance based on latitude and longitude. The median absolute value of the difference in these distances is 6.5 miles. Effects for Ivy Plus universities 10 to 25 miles away are still much smaller than for Ivy Plus universities within 10 miles, however, the magnitude for these slightly farther universities is positive and nontrivial. For elite universities, the magnitude for the universities 10 to 25 miles away is also positive, and slightly larger than for immediate universities, though both are imprecisely estimated. Effects for further universities are generally smaller. See appendix for details.

measure of selectivity.

Firms appear willing to give up selectivity for proximity. Ivy Plus universities more than 10 miles away do not experience a similar increase in recruiting as elite universities within 10 miles. The average proportion of students scoring above 700 on the SAT math is approximately twice as high at Ivy Plus universities relative to elite universities.

Second, while firms value proximity, it is strikingly clear that conditional on proximity they highly value selectivity. When these firms open new offices, Ivy Plus universities experience the largest increase in the likelihood of attracting a firm.

Third, there are positive magnitudes for universities more than 25 miles from the new office. With only one exception, these are not statistically significant from zero, and they are much smaller than the immediate effects, but the magnitudes are still relatively large. For example, when firms open offices 50-100 or 100-200 miles from a highly selective/selective university, the likelihood of recruiting increases by .4 to .5 percentage points. Among firm/university pairs in these tiers that experience a move, the likelihood the firm was recruiting in the years before the move was only .1%. This implies the likelihood of attracting a firm is four to five times higher after the move. It also suggests that firms are willing to recruit at these farther universities rather than closer, and potentially more selective universities. The results suggest firms are willing to give up on proximity for other university attributes.

Unlike the effect of office openings, closing an office more than 10 miles from an Ivy Plus or elite university has large, though generally imprecisely estimated effects (Figure 4d, Table 3). Closing an office 10 to 25 miles from an Ivy Plus university led to a statistically significant 25.4 percentage point decline in the likelihood of recruiting.

These results also suggest the mechanism underlying the distance elasticity. The dramatic decreasing effect with relatively small changes in distance is unlikely explained by firms' concern that applicants will reject offers due to migration frictions. Instead, it suggests employer search costs increase rapidly with distance.

Illustrative Examples: Office Openings in Boston and Houston To provide further intuition, I estimate (3) including only firm/university pairs that experience a nearby office opening in Boston, MA. I also include all firm/university pairs that do not experience move ins during the sample. I implement the same exercise for Houston, TX openings. Boston and Houston experience the greatest number of openings in the sample.

After firms open a Boston office, students at Boston-area universities are more likely to have on-campus access to these firms through their recruiting activities (Figure 5a). There are 13 firms opening Boston offices during the sample, and 16 instances of these firms begin-

ning to recruit at universities where they had not recruited before they opened their Boston office.

Second, for universities with relatively similar selectivity, firms highly value proximity. Six firms begin recruiting at Harvard, five at MIT, but none at Brown (25-50 miles away) and only one at Dartmouth (100-200 miles away) both of which are also Ivy Plus universities.[23] There is also some evidence that firms appear willing to give up selectivity in order to recruit at closer universities. Firms start recruiting at Tufts and Boston University within 10 miles, but not at Brown, an Ivy League university 25 to 50 miles away. For each of the firms that starts recruiting locally after opening their Boston office, the office previously closest to the university was in New York, New Jersey, or Connecticut. Relatively short distances were keeping these firms from recruiting at these highly selective Boston-area universities.

Third, conditional on distance, these firms highly value university selectivity. Among very local universities, Ivy Plus universities experience dramatically larger effects from new Boston offices than other universities, including elite universities.

Firms recruit at universities over 50 miles away, including Dartmouth (100-200 miles away), Amherst, and Mount Holyoke (50 to 100 miles). In some cases firms are giving up proximity for relatively small or not obvious gains in selectivity. These universities have some other desirable attribute that justifies the increased travel costs.

Similarly, after firms open a Houston office students at Houston-area universities are more likely to have on-campus access to these firms through their recruiting activities (Figure 5b). There are 13 firms opening offices in Houston, and six instances of firms beginning to recruit at local universities which they had not targeted before. More than the Boston plot, this figure suggests firms are willing to give up proximity in order to recruit at universities with some other attribute. More firms start recruiting in Austin (about 150 miles away) rather than at Rice which is in Houston and more selective. Firms are willing to give up on proximity and selectivity to recruit at a university with some other attribute (perhaps most dramatically the number of students). In recruiting at UT Austin (Highly Selective), firms are also passing up University of Houston (Selective) which is immediately next to the new office and Texas A&M which is about 50 miles closer than Austin, and also a large university in Barron's Highly Selective tier.

Do Firms Adjust Recruiting Even For Relatively Small Changes in Distance? I evaluate whether firms adjust recruiting even when there is a relatively small change in firm-university distance by estimating (3) and including $Post\_r * PreFar$ interactions. The

[23]The firms recruiting at Harvard after opening a nearby office include the banking firms Evercore Partners, Macquarie Group, William Blair & Company, and Gleacher & Company, and consulting firms Booz & Company and OC&C Strategy Consultants.

variable $PreFar$ is an indicator for whether the distance before the move was at least 150 miles. Even for pairs that were relatively close before the office opening ($<$ 150 miles), there is still a positive effect on recruiting after the closer office opens for Ivy Plus and elite universities (Figure 6a). This suggests short distances are keeping firms away from recruiting at universities they would otherwise target. Distance appears more valuable to these firms than other university attributes which could determine recruiting choices.[24]

The reason that firms are not recruiting at these relatively close by universities before the office opening is unlikely concern that the applicants will reject offers. It appears more reasonable that the effects are driven by employer costs that increase dramatically with distance.

There is no decline in the likelihood of recruiting after office closings, for pairs that are still within 150 miles of the firm after the office closing (Figure 6b).

Do Firms Adjust Recruiting Even if they have an Existing Target Campus Nearby? The previous exercises have assessed the firm's value for distance using the distance between the firm and university. An additional strategy is to test how the effect of an office opening varies with distance between the firm's new location and its closest existing target. If firms adjust recruiting at local universities even when they have a relatively nearby campus where they have already been recruiting, this suggests a high value on distance relative to recruiting experience at a university.

I estimate (3), but additionally include $Post\_r * ClosestTargetFar$ interactions. The variable $ClosestTargetFar$ is an indicator for whether the firm's closest existing target to their new location is at least 150 miles. Strikingly, there is a large positive effect on local recruiting across selectivity tier even when the firm has an existing target campus that is relatively close, within 150 miles (Figure 6c). The costs of recruiting slightly farther away at existing target campuses are greater than the benefit of recruiting at a university where the firm has experience.

It is unlikely that firms substitute away from these relatively nearby existing target campuses because they are concerned about applicants rejecting offers. Instead it appears more likely the results are driven by employer search costs that increase dramatically with distance. Alternatively, location preferences might be strong in the new market giving the firm monopsony power.

The magnitudes in Figure 6d suggest no decline in recruiting after office closings if the firm's closest existing target is far from the new location, though these are imprecisely

[24]Appendix Table A9 and Appendix Figure A5 show the relationship between recruiting, pre-move and post-move distance, and selectivity using a polynomial in post- and pre-move distance and a continuous measure of selectivity.

estimated. This is consistent with firms not dropping target campuses after closings if they are still relatively nearby after the closing (Figure 6b).[25]

The Selectivity of New Target Campuses

I test whether the firm's new target campuses after office openings are less selective than the firm's other target campuses. I identify the universities that never attracted the firm before the move, but attracted the firm at least once after the move. As a measure of selectivity, I use the proportion of high math test score students at the university (see appendix for details on variable construction). For each of these 83 universities with selectivity data, for the year the firm starts to recruit at these universities I compare the university's selectivity to the median selectivity of the firm's existing target campuses in that year (excluding other universities added after a move). On average, the new target is 2.4 percentage points less selective than the median. The median difference is -5.8 percentage points. Nearly 60% of the new targets are less selective than the firm's median target campus.

New targets may be especially less selective in smaller markets. First, there are fewer very selective universities in smaller markets. I define large cities as those with urban area population greater than or equal to the 25th percentile of the post-move regression sample (approximately 3.06 million people). The 90th percentile of university selectivity in smaller markets is over 40% less than the 90th percentile in larger markets. New targets may also be less selective in smaller markets because of distance between these markets and existing targets, location preferences in or against these markets, or fewer competing firms.

Regression results suggest when firms open offices in large cities selectivity of new target campuses is roughly equal to their median target campus. In smaller cities, new targets are 17.1 percentage points less selective than the firm's median target (Appendix Table A8). This is not explained by larger distance to existing targets in smaller markets (column 2).

Conditional on whether the office is opened in a big city, and on the distance to existing targets, there is a positive effect of competing firms on the new target's selectivity (column 3). This also reduces the coefficient on the indicator for new office in a large city. The sample size is quite small to separate these effects. However, it is consistent with firms being willing to add less selective targets when they can offer lower wages due to lower competition.[26]

[25] Appendix Table A9 and Appendix Figure A5 show the relationship between distance to closest existing target campus and recruiting, using a polynomial in distance to closest target.

[26] Appendix Table A8 also shows results using ln(urban area population) instead of an indicator for big city.

5 Alternative Explanations and Robustness

Are Local Workers More Productive?

Recruiting from local universities may instead reflect that local students are more productive, rather than reflecting search or migration frictions. This may also explain why firms are willing to substitute away from more selective universities. Local students may have more knowledge of the local economy, or be better acquainted with local business culture.

I test this hypothesis using differences in typical travel across consulting firms. For some consulting firms, entry-level consultants are away from their home office Monday through Thursday every week, suggesting that local knowledge and local culture may be less important. Additionally, some firms implement global staffing, in which a consultant whose home office is Boise, Idaho is equally likely to work on a case in South Dakota, Boston, or London relative to a consultant based in one of those offices. If firms requiring extensive travel still recruit at local universities after office openings, the importance of the student's local knowledge is unlikely the explanation.

I collect information on travel for each of the consulting firms in the sample, based on the careers section of the firm's website, the description of the company on Vault.com, and occasionally using the Wayback Machine for firms that no longer exist.[27] I denote a firm as requiring extensive travel if they employ a global staffing policy, or employees generally travel frequently.

Of the 42 consulting firms in the sample, 17 are coded as requiring extensive travel (Appendix Table A4).[28] I estimate the principal regressions limiting the sample only to firms with extensive travel, and then separately for firms with less travel. Even among firms with extensive travel, when they open and close offices they adjust recruiting at local universities (Appendix Table A3).

Is the Value of Proximity Explained by Founders' Alma Mater

In deciding which employees to charge with opening a new office, firms may choose those who attended universities in the area of the new office. If these alma maters are in the immediate vicinity of the new office, this may explain the very local recruiting rather than employer search costs.

I evaluate this explanation using data collected from *LinkedIn*. For each firm/city pair where the firm adds a local target campus after opening a nearby office, I collect data on the

[27] The texts I use to determine these designations are available upon request.

[28] Giuliani Partners has insufficient information to code the travel variable, so I code it as missing.

firms' employees. Specifically, I identify the employees of the firm who currently work in the office that was opened during the sample period. Of these, I identify the employees who were employed by the firm at least one year prior to the year in which this office was opened. This is meant to approximate the set of employees who were sent to open the office, "founders", rather than those who were hired shortly afterward. For these employees, I collect data on their bachelor's and master's universities.

The search yielded data on education for 70 employees at 18 firms, covering 38 of the 84 firm-university pairs that added target campuses after opening a nearby office. Approximately 80% of these new targets were not the alma maters of any of the office "founders". This suggests alumni recruiting does not explain the strong relationship between proximity and recruiting.

5.1 Robustness

For robustness, I estimate an alternative specification including a quadratic in distance, rather than using a discrete radius to identify moves. I include all observations for a firm/university pair and analyze any within-pair change in distance, rather than only those associated with the first move.

Appendix Table A5 shows that within a firm/university pair, decreasing the distance between the firm and university has a positive effect on recruiting. I evaluate the coefficients for decreases in distance at the 75th and 90th percentile of distance decreases (approximately 350 and 640 miles respectively), for firm/university pairs that are approximately 70 miles apart after the move (approximately the 25th percentile of firm/university distance among pairs experiencing the firm moving closer to the university).

If a firm moves 350 miles closer to the university, to a distance of 70 miles, the firm is approximately .6 percentage points more likely to recruit at the university. If a firm moves 640 miles closer to the university, to a distance of 70 miles, the firm is approximately 1.2 percentage points more likely to recruit at the university. This effect is similar to the effect when defining a move in as moving at least 50 miles closer to a distance within 200 miles.

Do Firms Open Offices In Order to Recruit?

One threat to identification is that firms are opening offices in particular locations for the purposes of recruiting. In this case, there would be no causal effect of office location decisions on which universities have greater access to firms' job opportunities through recruiting activity. While this may be true for manufacturing and technology companies, it is unlikely for consulting firms and banks based on industry accounts. In their chapter of Management

Consulting Today and Tomorrow, Greiner and Malernee (2018) note that management consulting firms typically open new office locations when clients ask to be served in new ways.

Second, the scale of hiring for consulting firms and banks is relatively small, further mitigating concerns they would open offices to recruit a small number of employees. To evaluate the scale of hiring, I use data on hires by firm from the 2007 annual report of the University of Michigan's Ross School of Business. I use 2007 since this may yield the highest estimate, given it is a year of economic expansion preceding the Great Recession. I use the University of Michigan because it is a large university attracting many of these firms.

These data list hires by firm for firms hiring at least 10 students from the business school, for either fulltime or internship positions from any degree program. Among the firms in my sample, seven consulting firms and five banks hire at least ten Michigan students and so I observe actual hires for these firms. Among these companies, the average number of fulltime hires (MBA, Master's in Accounting, and BBA) was approximately 14 for consulting firms and 13 for banks. This is a substantial overestimate given that an additional 29 firms in my data recruited or hired at the University of Michigan Business School in 2007, but hired fewer than 10 students. It seems unlikely these firms were opening offices to recruit a relatively small number of employees.

I present three additional results and tests of whether the results might be driven by this reverse causal mechanism. First, Figure 4b shows smaller, but positive effects on recruiting when firms open offices that are not immediately next to the university. If the purpose of opening a new office were to recruit from these universities, the firm would have opened an office much closer.

Second, if the firm was recruiting at universities in the area prior to opening a local office, it is unlikely to be opening an office in order to recruit at other universities in the area. If the firm was opening offices for the purpose of recruiting, it would likely have done so earlier and for the purpose of recruiting at its existing target. Figure 6c suggests a positive effect on recruiting when firms open a new location that was unlikely opened for recruiting, given the firm had already been recruiting at a different university nearby.

Third, I analyze whether office openings are explained by university changes. The principal results control for university-year fixed effects, which will capture any changes in university characteristics over time. This ensures the results are not driven by changes in university characteristics that lead to office openings/closings. I also formally test whether university characteristics are correlated with timing of office openings or closings. I estimate regression (2), excluding university-year fixed effects, with university characteristics as dependent variables.[29]

[29]The dependent variables are constant within university-year cells.

Universities may become slightly more selective at the same time firms move in, however, the effects are quite small and imprecise and only for some dimensions of selectivity (Appendix Table A12). Controlling for these university characteristics in regression (2), without university-year fixed effects, also has little effect on the results (Appendix Table A6).[30] Finally, I show that the urban areas attracting new offices or losing offices are not experiencing this across many firms timed with the move (Appendix Table A7). This suggests the results are not explained by dramatic changes in the urban areas experiencing these moves.

6 Effect of Firms' Office Location Decisions on Post-Graduate Earnings

The first part of the paper shows how employer office location decisions, arguably exogenous to universities, affect which universities have greater access to the firm's job opportunities through their recruiting activity. Now I show how access to elite firms at labor market entry, driven by office location changes, affects earnings. I use data on earnings outcomes by university and birth cohort from the *mobility report cards* (Chetty et al. 2017), based on federal tax records. I focus on the probability that an individual reaches the top 1% (upper-tail success rate) and the top 20% (success rate) of earnings for their birth cohort, conditional on their parents' income quintile. I limit the regressions to the 1980-1984 cohorts, 30-34 years old at the time when earnings are measured. Chetty et al. (2017) find that incomes are relatively stable by the time individuals are 30.

I match earnings outcomes of birth cohorts to recruiting outcomes when they were in college. I match to the recruiting outcomes when the birth cohort was 22 years old, to approximate access to new recruiting firms when they were seniors in college. For robustness I also match recruiting outcomes in a given year to mobility outcomes at 30-34, for individuals who were 20-22 in that year.

The firms in my sample are precisely the firms that could enable mobility into the top income quintile and top 1%. Chetty et al. show that for 32-34 year olds in their sample, the mean family income in the top 1% for the cohort is $114,000 (2012 dollars). As shown above, starting wages for these jobs are roughly $70,000 (2016 dollars), and at 30-34 median wages are $100,000 to $130,000. Even if the students are not still employed by these particular firms by 30-34, starting at these firms may have an important effect on career trajectory.

I test for within-university changes in success rates when there is a change in access to high-wage firms driven by firms opening offices within 10 miles of the university. I estimate:

[30]The measure of university selectivity is only available starting in 2004. I compare results including university characteristics to results excluding these characteristics, but on the same post-2003 sample.

$$Pr(Top1\%|ParentQuintile = q)_{jklt} = \alpha + \gamma_j + \beta_1 NewOffices_{jklt} + \beta_2 RecruitPostMove_{jklt} + \kappa_{kt} + \delta_{lt} + u_{jklt}$$

The variable $NewOffices$ is the cumulative number of new offices within 10 miles of university j, in university selectivity tier k, in CZ l, in year t. The variable $RecruitPostMove$ is the number of firms recruiting at the university in year t after having opened an office within 10 miles of the university. I include university fixed effects, and university tier-year fixed effects (κ_{kt}). This identifies the effect relative to the change in success rate that year for students graduating from universities in a similar tier.

Universities experiencing an increase in recruiting firms after office openings may be in areas experiencing overall increases in economic activity and increases in success rates. I include commuting zone-year fixed effects, δ_{lt}, to compare changes in success rates at universities experiencing an increase in recruiting firms after office openings to changes at other universities in the same CZ that are not experiencing an increase in recruiting firms. This also omits universities which are the only university in their CZ. In some specifications, I further include linear university trends. I weight the regressions by the counts within the college by cohort cell as in Chetty et al. (2017).

Column 1 shows results without commuting-zone year fixed effects. An additional firm recruiting on campus at graduation, after opening a nearby office, raises the likelihood that students reach the top 1% by .99 percentage points, for students whose parental income was in the bottom quintile (Table 4, column 1). We see a similar pattern for reaching the top 20%, though the effects are not precisely estimated (Panel B). The online appendix also shows positive marginally significant effects on the success rate for students whose parents were in the second quintile.

Column 2 includes commuting zone-year fixed effects. The magnitude increases, suggesting an additional recruiting firm increases the upper-tail success rate by 1.35 percentage points. This is four times larger than the effect for students whose parents were in the top quintile (column 5). Among university observations attracting firms after the opening of nearby offices, before the opening on average 6.8% of their students reach the top 1% of incomes by 30-34, if they were in the bottom parental income quintile. The coefficient in column 2 suggests that an additional high-wage firm recruiting on campus increases the upper-tail success rate by 20%.

Put differently, a 1.35 percentage point increase in the likelihood of reaching the top 1%

implies an average additional 2.5 students from the bottom parental income quintile reach the top 1%, after one of these firms opens a nearby office.[31] With some assumptions, the firms in my sample hiring from University of Michigan Ross School of Business hire an average of 3 bachelor's in business (BBA) students into fulltime jobs.[32] At universities attracting firms after a nearby office opening, the number hired is likely larger than three, given these universities are much larger than the Ross School of Business BBA graduating class in 2007 (364 students). The magnitude of 2.5 additional students from the bottom quintile reaching the top 1% seems important and reasonable in this setting.

Column 3 further includes university-specific linear trends in the specification, and there is a further increase in magnitude. These results suggest employer decisions exogenous to the universities affect variation across universities in upward income mobility.[33]

7 Effect of Office Location Decisions on Hires: Case Studies

I complement the main analysis by looking at the effect of firms' office location decisions on hires using regression analysis of the two case studies described in the introduction. Here I present a more thorough analysis comparing hires by firms increasing local presence to hires by other firms from the same university. Unlike recruiting schedules, these firms generally do not post online the number of people they hired from a given university. However, some universities report data on hires by firm, for the top hiring firms. I collect annual reports from University of Michigan Ross School of Business and Ohio State University Fisher College of Business to create a panel of fulltime undergraduate hires by firm.

[31] Among university observations attracting recruiting firms after a nearby office opening, the average number of students in years they are attracting the firm after the opening is 3260, and on average 5.7% of the students are from the bottom parental income quintile. This implies on average 185.8 students from the bottom parental income quintile. Raising the percent reaching the top 1% by 1.35 percentage points implies an additional 2.5 students.

[32] There are 17 banking firms and 12 consulting firms hiring or recruiting from University of Michigan Ross School of Business, but hiring fewer than 10 students across all degree levels. For these firms I do not know actual number of BBA hires. Using the actual BBA hires for the seven consulting firms and five banking firms for which I have data, I calculate the percent of all hires that are BBA versus MBA students, separately for finance and consulting firms. For finance firms this is .5 and for consulting firms this is .33. To calculate the average BBA hires for the firms in my data at University of Michigan, for firms where I do not know the exact number of hires I assume these firms hire five total students and of those five they hire the same percent BBA students as those in the same industry for which I have data. Because of data availability, these numbers also do not include any hires from schools other than the business school at University of Michigan.

[33] Appendix Tables A13 and A14 show similar results matching recruiting in a given year to mobility at 30-34 for cohorts who were 20-22 that year.

Other universities also make this information available, but I focus on these two because of the higher response rate and the number of years the hires data is available. I do not observe Huron and JP Morgan hiring at all other universities, which would help rule out the firm is increasing hires from many universities timed with these particular moves. However, I will compare their hires to hiring by other similar firms at the same university, mitigating concerns that effects are explained by industry or university changes timed with the move.

Huron Consulting Group opened a Detroit office in 2007. Before opening this office, their Chicago office was the closest office to University of Michigan. The annual reports of the University of Michigan Ross School of Business list number of hires by the top hiring firms. I collect these annual reports from 2002 to 2013, and include in the data any consulting firm with data before 2007. This yields nine firms. For several of these firms I know only an interval for the number of hires. However, in most cases these intervals are quite narrow, for example less than two hires. I use the midpoint of the interval, but also use alternative specifications discussed below. I estimate a regression with firm and year fixed effects:

$$Hires_{ft} = \alpha_0 + \gamma_t + \delta_f + \sum \beta_t year\_t_t * Huron_f + u_{ft} \tag{4}$$

The coefficient β_t identifies differential changes in hires for Huron in each year, relative to the other consulting firms. Relative to the other consulting firms in 2007 (the year Huron opens a local office), it hires an additional five people from Michigan's business school relative to its hiring in 2006 (Figure 7a). This is also true in 2008. Thus, there is strong evidence that after opening a local office, Huron meaningfully increases hires from University of Michigan.

There is not strong evidence the effect persists during the recession, and for the years 2011 through 2013 we know only that the firm hired fewer than approximately 10 students. Figure 7a shows the results using the midpoint of the interval, but using the minimum or maximum of the interval would clearly yield different conclusions for 2011-2013. Importantly we do not see evidence that Huron is increasing the number of hires from University of Michigan leading up to opening the office. This mitigates concerns that they open the Detroit office because they increasingly value recruiting from University of Michigan. Similarly, it mitigates concerns that the increase is part of a longer-run trend.

Second, I analyze JP Morgan hiring after it increases its presence in Columbus, Ohio. In 2000, JP Morgan merged with Chase, and Chase had a presence in Columbus. More importantly, in 2004 JP Morgan Chase merged with Bank One. Up until 1998, the headquarters for Bank One was in Columbus and so its presence there was quite strong even after it moved its headquarters to Chicago. As further evidence that JP Morgan increased its presence in Columbus, in 2006 Columbus is listed as a headquarters for JP Morgan Investment Banking but it previously was not listed on the website.

I collect annual reports from the Ohio State University-Fisher College of Business from 2000 to 2017. I construct a dataset of hires by JP Morgan Chase, and five other finance/accounting firms with greatest coverage in the data. For each of these firms, I know the exact number of hires from the university for at least 15 of the 18 years. Again, if I know only the interval I use the midpoint of the interval and also estimate alternative specifications. I estimate a specification similar to equation (4).

Relative to other firms, JP Morgan Chase dramatically increases its hires from Ohio State starting in 2004, the year of the Bank One merger (Figure 7b). The initial effects are large, with JP Morgan Chase hiring an additional ten students from Ohio State relative to other firms and relative to the difference in 2003. By the end of the period, these effects are even larger, with JP Morgan Chase hiring an additional 40 Ohio State students.[34] The second case study also presents strong evidence that when firms increase their presence in the local market, students at local universities experience meaningful impacts on likelihood of being hired by these firms. Again, there is not evidence that JP Morgan Chase was differentially increasing hiring from Ohio State in years leading up to the Bank One merger.

8 Conclusion

This paper studies how employer decisions affect university variation in graduates' labor market opportunities. For 2000 to 2013, I collect data on office locations and recruiting strategies of over 70 prestigious finance and consulting firms.

Firm decisions about office locations affect which universities have greater access to their job opportunities through recruiting activity. After opening an office, firms are twice as likely to recruit at nearby universities. Five or more years after closing offices, there is an 85% decline in the likelihood of recruiting at universities in the market of the closed office.

The costs of distance appear large. Changes in recruiting for only small changes in distance reflect the mechanism is likely employer search costs that increase with distance rather than applicant migration frictions. Conditional on university selectivity, firms highly value recruiting at universities within 10 miles of their new office. Firms appear willing to sacrifice selectivity and recruiting experience at other universities to recruit at only moderately closer universities. While the results suggest firms value proximity, it is also strikingly clear that conditional on proximity, firms highly value university selectivity.

Using *mobility report card* data (Chetty et al. 2017), I show access at graduation to

[34]JP Morgan Chase does not simply absorb the hires previously made by Bank One. In 2003-2004, the last year Bank One is in the Ohio State data (the merger was announced in January 2004 and completed in July), they hired 9 students.

an additional high-wage firm recruiting on campus, after opening a nearby office, raises the likelihood that students reach the top 1% of earnings at age 30-34 by 1.35 percentage points (20%), for students whose parents were in the bottom quintile. This is four times larger than the effect for students with parents in the top quintile. With two case studies and data on hires by firm from two business schools, I show firms significantly increase hires from local universities after increasing their local presence.

This paper has focused on the recruiting strategies for very high-wage jobs. Studying recruiting for jobs outside this group is also of interest, including for understanding income mobility. For lower-wage jobs, firms may more likely recruit locally because of stronger applicant migration frictions in those markets, or reduced benefit of recruiting at more selective national universities. However, the opportunity cost of travel may also be lower for firms recruiting for lower-wage jobs, which may lead them to recruit slightly farther away.

The results suggest that some universities may have higher upward income mobility than others because of employer office location decisions exogenous to universities. This has important implications for how students select universities, and teachers, parents, and policymakers advise those decisions. The results also suggest that local economic development policies, which attract firms to municipalities or states, may improve access to high-quality jobs for people in those markets.

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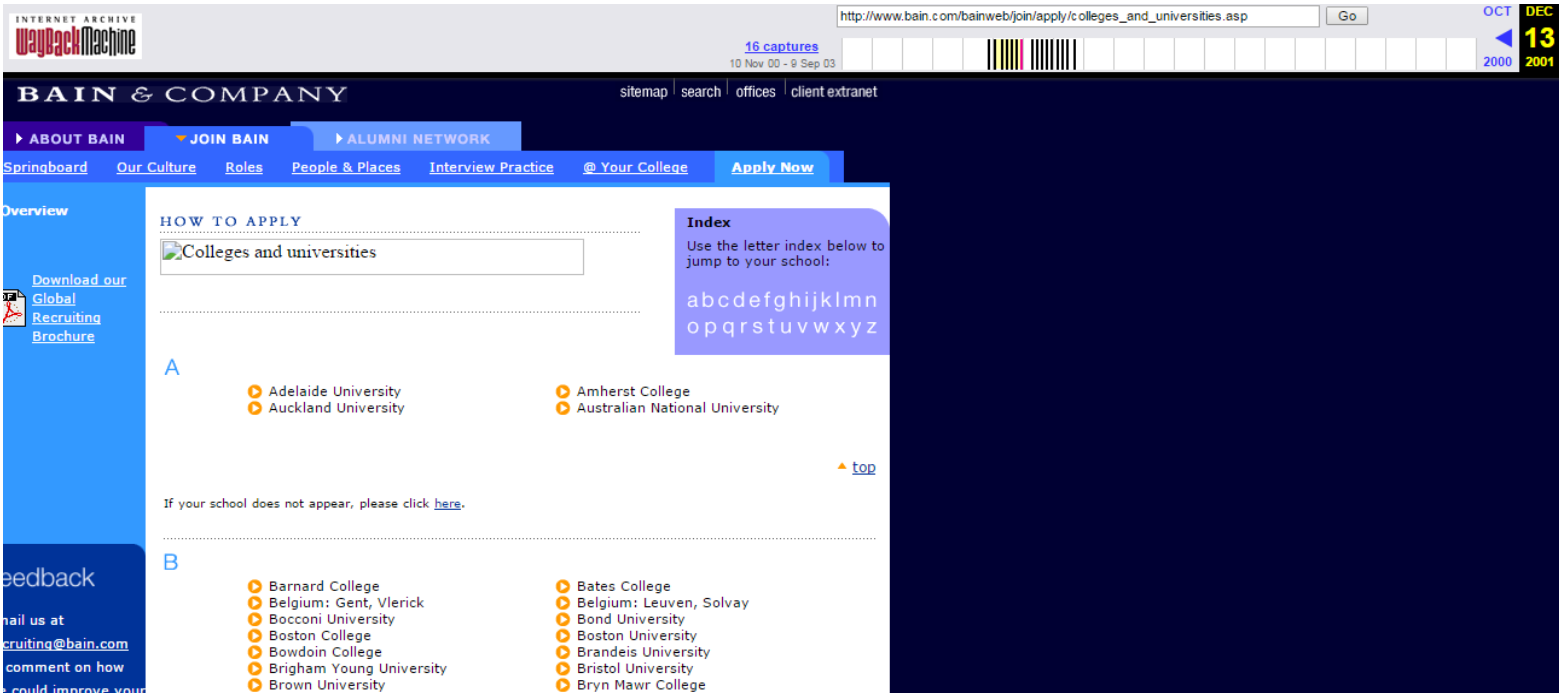
Figure 1: Data Collection from *The Internet Archive Wayback Machine*: Bain & Company Recruiting Pages

(a) University-Specific Links

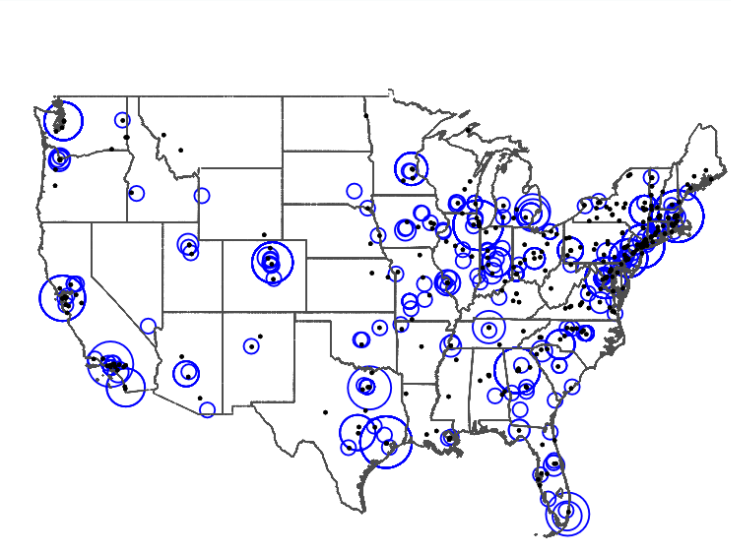


(b) Dartmouth-Specific Link

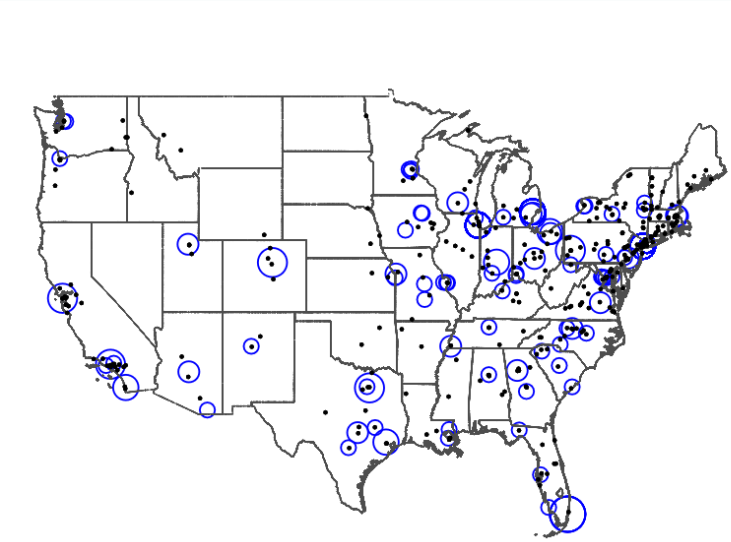
Note: This figure gives an example of the data collection for the consulting firm Bain & Company in 2001, using *The Internet Archive Wayback Machine*.

Figure 2: Cities Experiencing Move Ins and Move Outs, and Universities in the Sample

(a) Move Ins



(b) Move Outs



Note: These maps show all universities in the sample (solid dots) as well as cities experiencing move ins (in (a)) and move outs (in (b)). These are cities in which a firm opens an office (a) or closes an office (b). In addition, in (a) this move puts them at least 50 miles closer, and within 200 miles of at least one university. In (b) this move puts them at least 50 miles farther from at least one university when they had been within 200 miles of the university. I limit to the first move in and first move out experienced by each firm/university pair. Marker sizes are weighted based on how many firms move in or out of the city, based on these definitions of move in and move out. See text for details.

Figure 3a: Office Openings and Recruiting at Local Universities

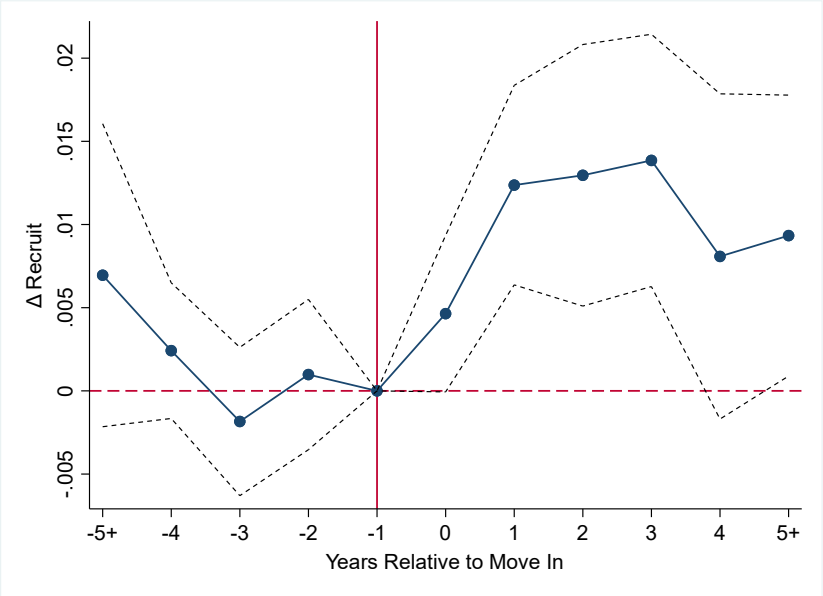
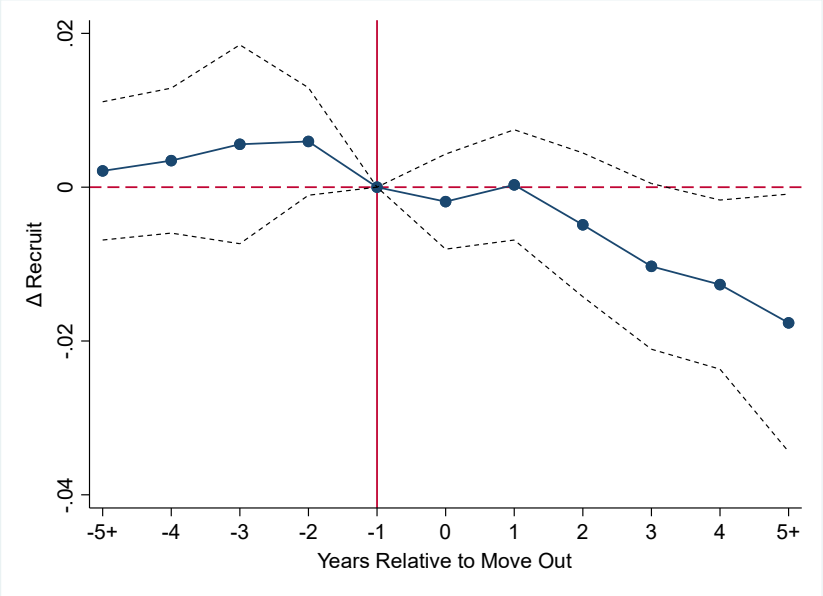


Figure 3b: Office Closings and Recruiting at Local Universities

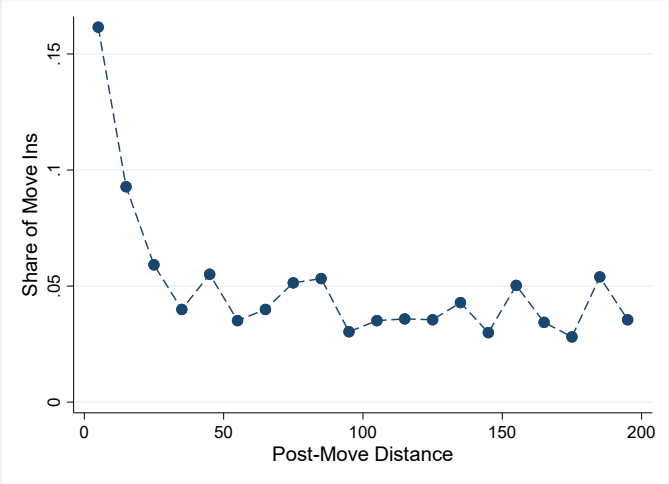


Note: These figures show the results of a regression of *Recruit* on indicators for period from the move in (Figure 3a) or move out (Figure 3b). Move ins are instances in which a firm moves at least 50 miles closer to a university, and the firm-university distance is within 200 miles. Move outs are instances in which the firm moves at least 50 miles farther from a university, when it had been within 200 miles. I limit to the first move in and first move out experienced by a firm/university pair. The dependent variable in the regression is an indicator for whether firm *f* recruits at university *j* in time *t*. The regression includes firm-university pair fixed effects, firm-year fixed effects, and university-year fixed effects. See text for details.

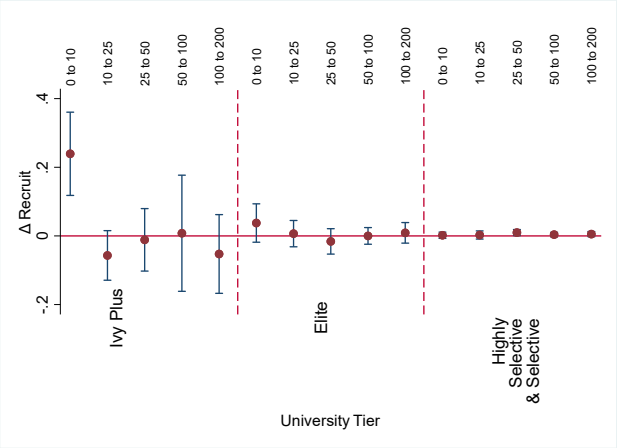
Figure 4

Effect of Nearby Office Openings, by Post-Move Distance and University Tier

(a) Distances After Move In

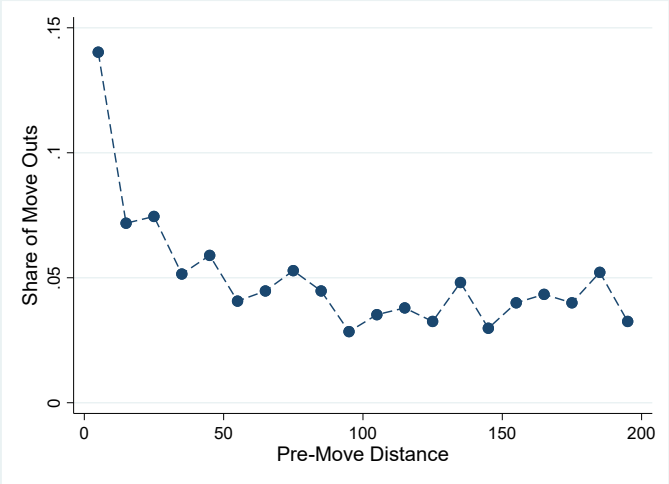


(b) Effect of Move In, by Post-Move Distance

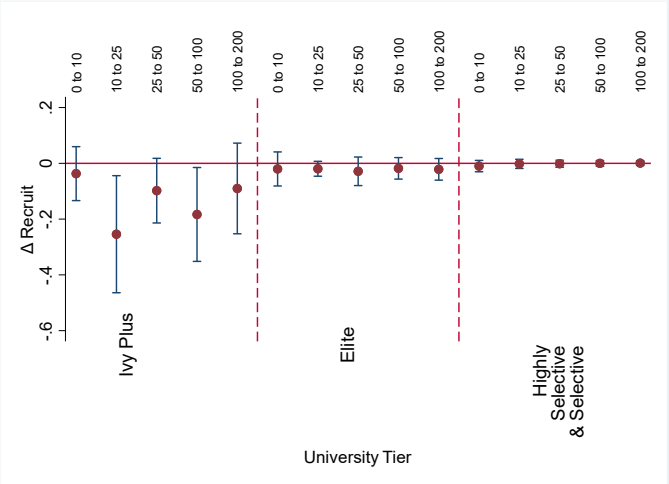


Effect of Nearby Office Closings, by Pre-Move Distance and University Tier

(c) Distances Before Move Out



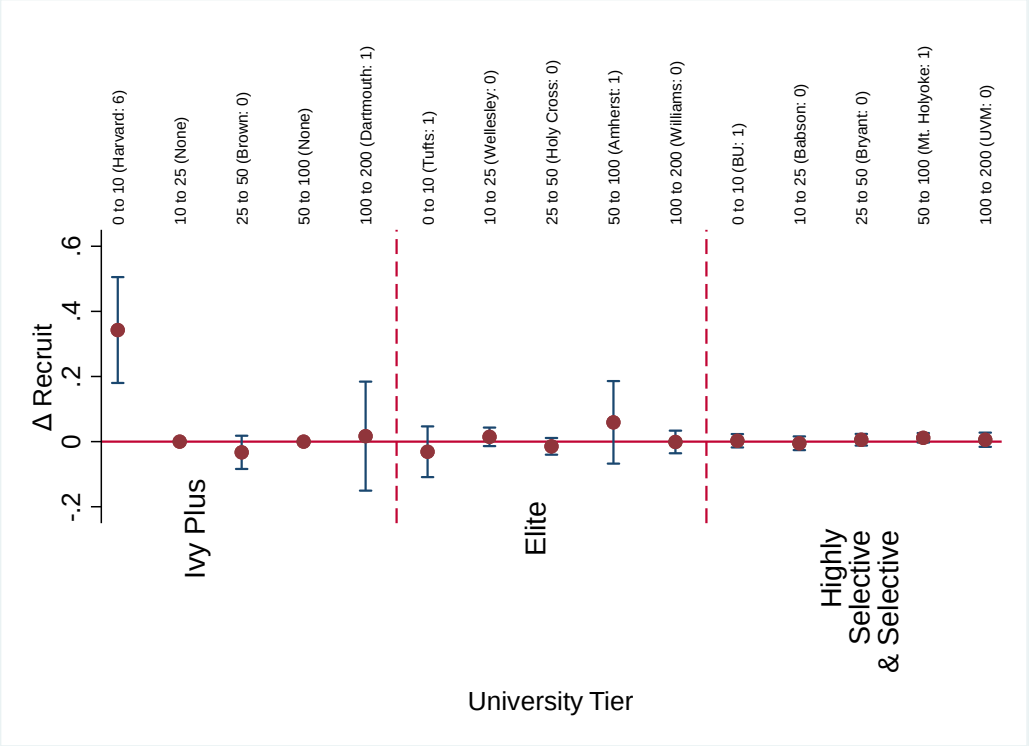
(d) Effect of Move Out, by Pre-Move Distance



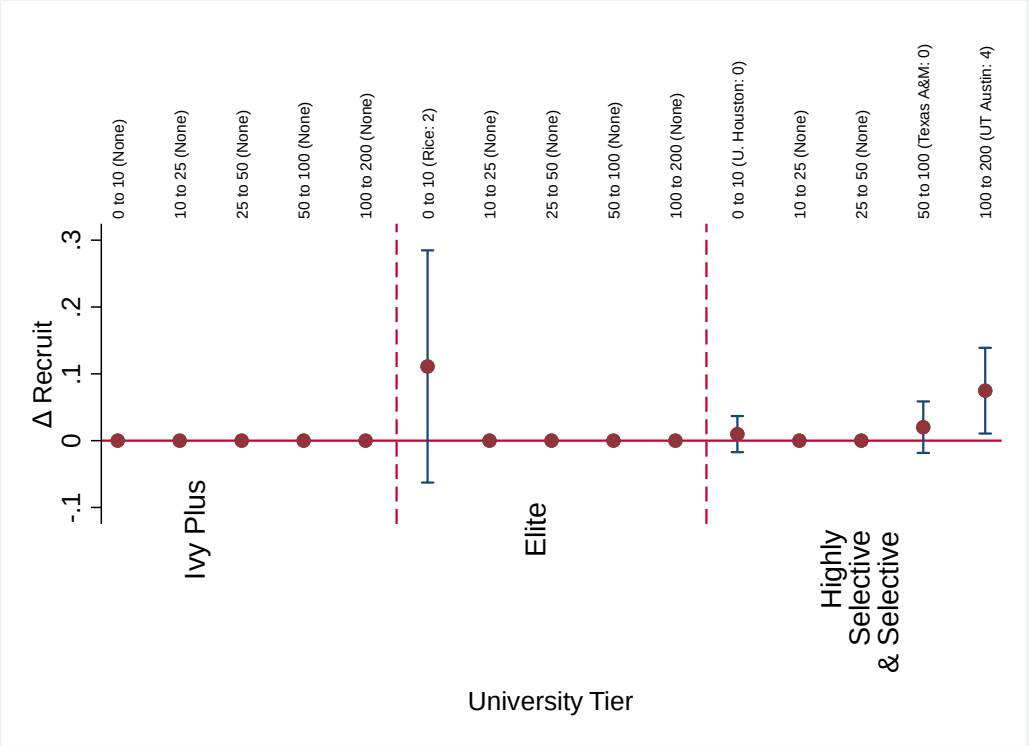
Note: Plot (a) shows a histogram of firm-university distance following an office opening, for firm-university pairs experiencing move ins. Plot (b) shows linear combinations of regression coefficients for varying post-move distances, by university tier. Regressions include firm-university, firm-urban area of closest office-year, and university-year fixed effects, an indicator for post-move distance 0-10 miles, 10-25 miles, 25-50 miles, 50-100 miles, and 100-200 miles, and each of these indicators interacted with indicators for three (out of four) bins of selectivity: elite (Barron's Tier 1 excluding Ivy Plus), Highly Selective and Selective (Barron's Tiers 2 through 5), and Not Selective/Insufficient Information (Barron's Tier 9 and not included in Barron's index). The omitted selectivity tier is Ivy Plus (Ivy League plus Stanford, MIT, University of Chicago, and Duke). I show only results for Ivy Plus, Elite, and Highly Selective and Selective. Plot (c) shows a histogram of firm-university distance preceding an office closing, for firm-university pairs experiencing move outs. Plot (d) is similar to plot (b), but shows linear combinations of regression coefficients for varying pre-move distances, by university tier. See paper for details.

Figure 5: Illustrative Examples: Effect of Office Openings on Recruiting, by Distance to University

(a) New Offices in Boston, MA



(b) New Offices in Houston, TX

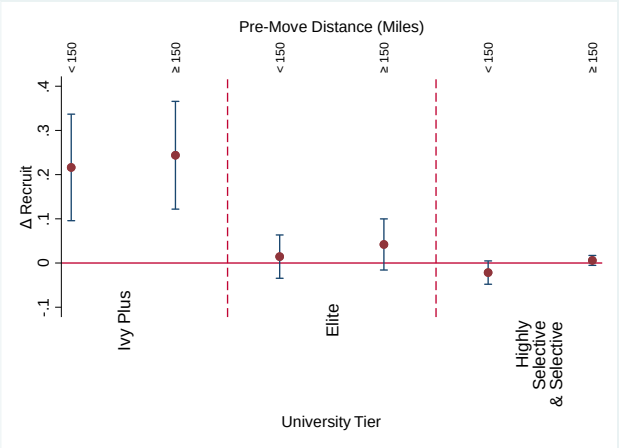


Notes: Coefficients in these plots are similar to those in Figure 4, but include only firm/university pairs for which the firm's new office was in Boston, MA (a), or Houston, TX (b), as well as all firm/university pairs that did not experience any move ins during the sample period. I list one example university for each radius and selectivity tier, and list the number of firms starting to recruit there following a move in parentheses. In cases with multiple universities per radius/tier, I list the university attracting the most firms after moves if any exist. Bars show 95% confidence intervals. See text and Figure 4 notes for details.

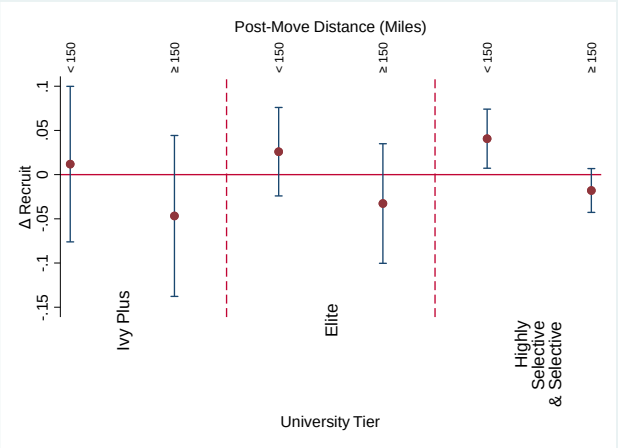
Figure 6

Effect of Nearby Office Changes on Recruiting, by Firm-University Distance

(a) Before Moving within 10 Miles

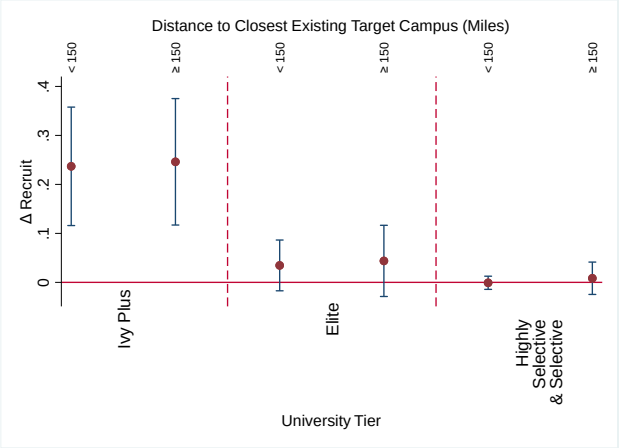


(b) After Closing Office within 10 Miles

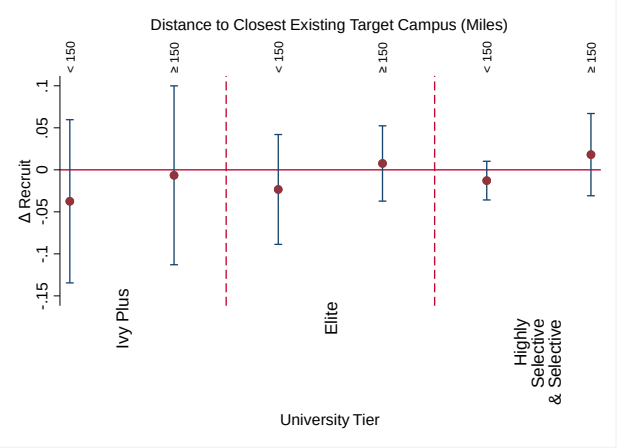


Effect of Nearby Office Changes on Recruiting, by Distance to Firm's Closest Existing Target Campus

(c) After Moving within 10 Miles



(d) After Closing Office within 10 Miles



Note: Plot (a) shows linear combinations of regression coefficients for universities of different tiers, which were within 10 miles of the firm after it opened its nearby office, for different levels of the pre-move-in distance to the firm. Plot (b) shows linear combinations of regression coefficients for universities of different tiers, which were within 10 miles of the firm before it closed its nearby office, for different levels of the post-move-out distance to the firm. Regressions are similar to those in Figure 4, but additionally include interactions between each of the distance bin indicators and an indicator for whether the pre-move-in (plot a) or post-move-out (plot b) distance was at least 150 miles. Plots (c) and (d) show linear combinations of regression coefficients for universities of different tiers, within 10 miles of the firm after it opened its nearby office (plot c) or before it closed its nearby office (plot d), for different levels of distance to the closest existing target campus. The regressions are the same as in (a) and (b), but instead of interacting the distance bin indicators with pre-move (plot a) or post-move (plot b) distance, I interact them with an indicator for whether the closest existing target campus is at least 150 miles away after the move. See paper for details.

Figure 7a: Huron Consulting Group's Undergraduate Hires from University of Michigan's Business School

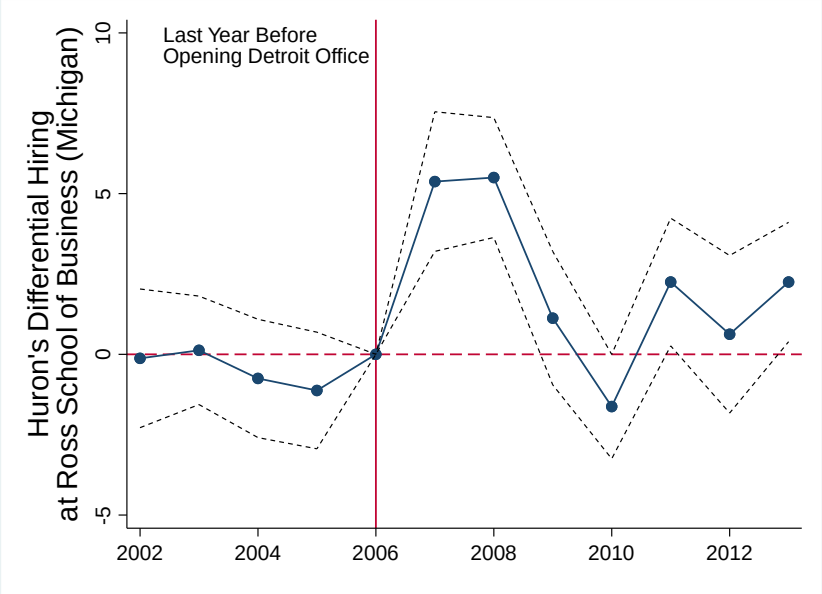
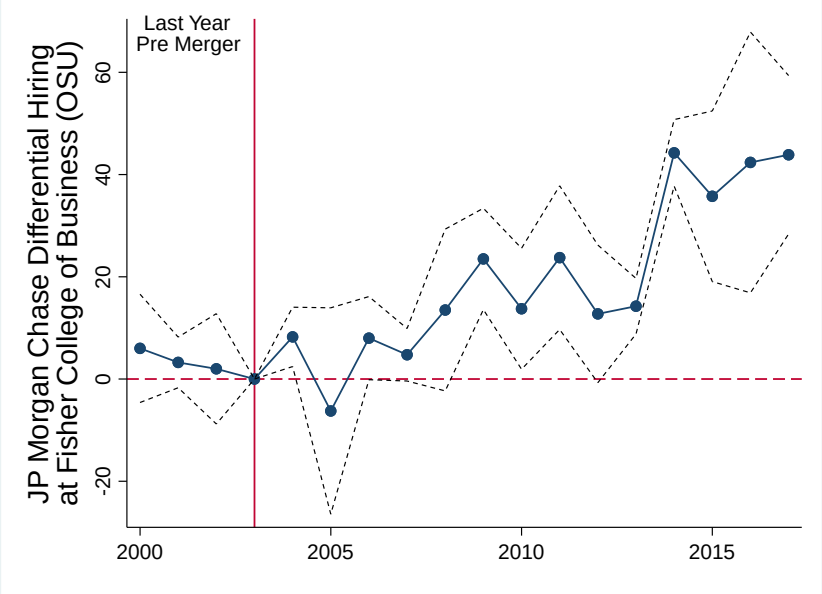


Figure 7b: JP Morgan Chase's Undergraduate Hires from Ohio State University's Business School



Note: These figures shows the differential change in hires surrounding Huron Consulting Group opening an office in Detroit, MI (6a) and JP Morgan Chase increasing its presence in Columbus, OH (6b). Coefficients show the differential change in hires relative to the base year for Huron from University of Michigan relative to nine other consulting firms with data before 2007 (6a) and JP Morgan Chase from Ohio State University relative to five finance/accounting firms with greatest coverage in the data (6b). For some firms and years I know only an interval for the number of hires. For those cases, these plots show results using the midpoint of the interval. See paper for details.

Table 1: Move Ins and Move Outs in the Sample

# Firms	73
# Consulting Firms	42
# Banking Firms	31
# Universities	362
# Firm/University Pairs (Move In Sample)	25,747
# Firm/University Pairs (Move Out Sample)	25,289
# Cities that are the Closest Office Location to a University (Move In Sample)	389
# Cities that are the Closest Office Location to a University (Move Out Sample)	367
# Firms with ≥ 1 Move In	51
# Universities with ≥ 1 Move In	359
# Firm/University Pairs with ≥ 1 Move In	3454
# Cities with ≥ 1 Move In	190
# Firms with ≥ 1 Move Out	42
# Universities with ≥ 1 Move Out	349
# Firm/University Pairs with ≥ 1 Move Out	1936
# Cities with ≥ 1 Move Out	85
Cities with Greatest Move Ins (#)	
Houston, TX	13
Boston, MA	13
Chicago, IL	12
Atlanta, GA	10
Los Angeles, CA	10
San Francisco, CA	10
Cities with Greatest Move Outs (#)	
Miami, FL	6
Dallas, TX	4
Denver, CO	4
Los Angeles, CA	4
Pittsburgh, PA	4
San Francisco, CA	4

Note: Move ins are defined as instances in which a firm moves at least 50 miles closer to a university and is within 200 miles. Move outs are defined as instances in which a firm moves at least 50 miles farther from a university and was within 200 miles. Moves are limited to the first move in and first move out. The sample drops singletons, including firm/university pairs only in the sample for one year, and firm/year pairs with only one observation in the sample (after dropping firm/university pairs that are singletons). See text for details.

Table 2: The Effect of Office Openings and Closings on Recruiting at Local Universities

Y = *Recruit*	Move Ins		Move Outs	
Post Move, Short Run	0.009**	0.008**	-0.009*	-0.007*
	(0.004)	(0.003)	(0.005)	(0.004)
Post Move, Long Run	0.003	0.007	-0.015**	-0.018**
	(0.008)	(0.004)	(0.006)	(0.008)
N	202,732	202,732	193,613	193,613
R-squared	0.601	0.637	0.604	0.641
Firm-University Fixed Effects	Y	Y	Y	Y
Firm-Year, University-Year Fixed Effects	N	Y	N	Y
Dependent Variable Mean				
Any Move In = 1, Post Move in = 0	0.008			
Any Move Out = 1, Post Move Out = 0	0.021			

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the firm level. All regressions include firm/university pair fixed effects. Columns 1 and 3 include year fixed effects, while the remainder include firm-year fixed effects and university-year fixed effects. Move ins are instances in which a firm moves at least 50 miles closer to a university, and the firm-university distance is within 200 miles. Move outs are instances in which the firm moves at least 50 miles farther from a university, when it had been within 200 miles. The variable *Post Move, Short Run* is an indicator for the year of the move, and the four years following the move event. The variable *Post Move, Long Run* is an indicator for five or more years following the move. I drop singletons, defined in Table 1, and limit to the first move in and first move out experienced by a firm/university pair. See text for details.

Table 3: The Effect of Office Openings and Closings on Recruiting by Firm-University Distance and University Tier

Y = *Recruit*	Move Ins			Move Outs		
Post Move*Distance when Proximity = 1 within						
0 to 10 miles	0.230***	0.234***	0.239***	-0.024	-0.029	-0.037
	(0.060)	(0.061)	(0.062)	(0.057)	(0.055)	(0.049)
0 to 10 miles*Elite (non-Ivy-Plus) Univ.	-0.189***	-0.192***	-0.202***	0.006	0.011	0.017
	(0.062)	(0.063)	(0.065)	(0.058)	(0.059)	(0.056)
0 to 10 miles*Selective Univ.	-0.230***	-0.234***	-0.237***	0.013	0.018	0.027
	(0.062)	(0.062)	(0.063)	(0.056)	(0.056)	(0.051)
10 to 25 miles	-0.051	-0.054	-0.057	-0.250**	-0.253**	-0.254**
	(0.034)	(0.036)	(0.037)	(0.108)	(0.108)	(0.107)
10 to 25 miles*Elite (non-Ivy-Plus) Univ.	0.056	0.060	0.064	0.234**	0.236**	0.235**
	(0.043)	(0.046)	(0.048)	(0.111)	(0.111)	(0.109)
10 to 25 miles*Selective Univ.	0.052	0.056	0.060	0.251**	0.252**	0.252**
	(0.034)	(0.036)	(0.037)	(0.108)	(0.108)	(0.107)
25 to 50 miles	-0.012	-0.011	-0.011	-0.096	-0.096	-0.098
	(0.046)	(0.046)	(0.046)	(0.058)	(0.058)	(0.059)
25 to 50 miles*Elite (non-Ivy-Plus) Univ.	-0.006	-0.007	-0.005	0.069	0.069	0.069
	(0.048)	(0.048)	(0.047)	(0.061)	(0.061)	(0.061)
25 to 50 miles*Selective Univ.	0.021	0.022	0.021	0.095	0.096	0.097
	(0.046)	(0.046)	(0.046)	(0.059)	(0.058)	(0.059)
50 to 100 miles	0.006	0.003	0.008	-0.180**	-0.179**	-0.183**
	(0.090)	(0.090)	(0.086)	(0.085)	(0.086)	(0.086)
50 to 100 miles*Elite (non-Ivy-Plus) Univ.	-0.009	-0.003	-0.008	0.170**	0.165**	0.165**
	(0.094)	(0.093)	(0.090)	(0.074)	(0.074)	(0.073)
50 to 100 miles*Selective Univ.	-0.003	0.001	-0.004	0.180**	0.177**	0.183**
	(0.090)	(0.090)	(0.087)	(0.085)	(0.086)	(0.085)
100 to 200 miles	-0.057	-0.053	-0.053	-0.091	-0.094	-0.090
	(0.058)	(0.058)	(0.059)	(0.076)	(0.077)	(0.083)
100 to 200 miles*Elite (non-Ivy-Plus) Univ.	0.064	0.061	0.062	0.072	0.074	0.069
	(0.054)	(0.054)	(0.054)	(0.087)	(0.088)	(0.092)
100 to 200 miles*Selective Univ.	0.064	0.059	0.058	0.092	0.094	0.091
	(0.059)	(0.059)	(0.060)	(0.076)	(0.077)	(0.081)
N	202,732	201,946	201,779	193,613	192,821	192,639
R-squared	0.638	0.641	0.649	0.641	0.644	0.651
Firm-University Fixed Effects (FE)	Y	Y	Y	Y	Y	Y
University-Year FE	Y	Y	Y	Y	Y	Y
Firm-Year FE	Y	Y	N	Y	Y	N
Urban Area of Closest Office (UA)-Year FE	N	Y	N	N	Y	N
Firm-UA-Year FE	N	N	Y	N	N	Y

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the firm level. Regressions are similar to Table 2, but include the effect of a move by post-move distance radius for move ins, and by pre-move distance radius for move outs. I also interact these effects with an indicator for university tier. The omitted category is the Ivy Plus tier (Ivy League plus Stanford, MIT, University of Chicago, and Duke). The elite tier consists of the universities in Barron's Tier 1, excluding the Ivy-Plus universities. The selective tier includes highly selective and selective universities in Barron's Tiers 2 through 5. I drop singletons, in columns 2 and 4 this includes dropping UA-Year pairs with only one observation in the sample. In columns 3 and 6 this includes dropping Firm-UA-Year pairs with only one observation in the sample. See text for details.

Table 4: On-Campus Access to Recently Relocated Firms at Graduation, and the Effect on Incomes at 30-34 Years Old

Y = Upper Tail Success Rate	Bottom Quintile Parental Income			Top Quintile Parental Income		
Cumulative New Offices Opened within 10 Miles	0.0008	0.0020	0.0069	0.0005	0.0006	-0.0003
	(0.0013)	(0.0024)	(0.0046)	(0.0005)	(0.0011)	(0.0018)
# Firms Recruiting After Moving within 10 Miles	0.0099***	0.0135***	0.0185**	0.0030**	0.0033*	0.0002
	(0.0037)	(0.0044)	(0.0085)	(0.0013)	(0.0018)	(0.0036)
N	1,601	1,136	1,136	1,601	1,136	1,136
R-squared	0.7072	0.8174	0.8734	0.9723	0.9824	0.9887
Mean of Dependent Variable	0.0316	0.0340	0.0340	0.0555	0.0596	0.0596
University Fixed Effects	Y	Y	Y	Y	Y	Y
University Tier-Year Fixed Effects	Y	Y	Y	Y	Y	Y
CZ-Year Fixed Effects	N	Y	Y	N	Y	Y
University Trends	N	N	Y	N	N	Y

Y = Success Rate	Bottom Quintile Parental Income			Top Quintile Parental Income		
Cumulative New Offices Opened within 10 Miles	-0.0011	0.0038	0.0015	-0.0013	0.0009	-0.0029
	(0.0033)	(0.0052)	(0.0123)	(0.0012)	(0.0022)	(0.0047)
# Firms Recruiting After Moving within 10 Miles	0.0115	0.0106	-0.0002	0.0043*	0.0081	0.0065
	(0.0086)	(0.0115)	(0.0205)	(0.0024)	(0.0050)	(0.0075)
N	1,601	1,136	1,136	1,601	1,136	1,136
R-squared	0.8547	0.8933	0.9278	0.9727	0.9805	0.9886
Mean of Dependent Variable	0.372	0.392	0.392	0.494	0.506	0.506
University Fixed Effects	Y	Y	Y	Y	Y	Y
University Tier-Year Fixed Effects	Y	Y	Y	Y	Y	Y
CZ-Year Fixed Effects	N	Y	Y	N	Y	Y
University Trends	N	N	Y	N	N	Y

Universities Attracting Recruiting Firms After Office Opening within 10 Miles, by University Tier

Ivy Plus	4
Other Elite Universities (Public and Private)	5
Highly Selective Public	3
Highly Selective Private	1
Selective Public	1
Selective Private	2

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the university level. Dependent variable is the probability students are in the top 1% ("upper tail success rate) or top 20% ("success rate") of the income distribution in 2014 for their birth cohort, conditional on parents' income in the bottom quintile (columns 1-3) or top quintile (columns 4-6). I use the 1980-1984 birth cohorts. Success rates are measured at the university by birth cohort level, and are from the *mobility report cards* (Chetty et al. 2017). The explanatory variables capture recruiting outcomes on their campus when these students were 22 years old. Observations are weighted by the count in the university by birth cohort cells, for the cohorts who were 22 in the given year. See text for details.

Appendix Table 1: Firms in Sample

Consulting Firms

A. T. Kearney
Accenture
Advisory Board
Analysis Group
Arthur D. Little
Bain & Company
Booz & Company
Booz Allen Hamilton
Cambridge Associates
Capgemini
Charles River Associates
Cornerstone Research
Corporate Executive Board
Dean & Company
First Manhattan Consulting Group
FTI Consulting
Gallup
Gartner Inc.
Giuliani Partners
Hewitt Associates
Huron Consulting Group
Kurt Salmon
L. E. K. Consulting
LECG Corporation
Marakon
Mars & Co.
McKinsey & Company
Mercer
Mitchell Madison Group
Monitor Group
Navigant
NERA Economic Consulting
OC&C Strategy Consultants
Oliver Wyman
PA Consulting Group
Parthenon Group
PRTM
Putnam Associates
Roland Berger
Stern Stewart & Co.
The Boston Consulting Group
ZS Associates

Banks

ABN AMRO
Allen & Company
Bank of America
Barclays
BNP Paribas
Brown Brothers Harriman
Citi
Cowen Group
Deutsche Bank
Evercore Partners
Gleacher & Company
Greenhill & Co.
Houlihan Lokey
HSBC
Jefferies & Company
JP Morgan Chase & Co.
Keefe Bruyette & Woods
Lazard
Macquarie Group
Morgan Keegan & Co.
Morgan Stanley
Perella Weinberg Partners
Piper Jaffray Companies
Raymond James Financial
RBC Capital Markets
Robert W. Baird & Co.
Rothschild
Thomas Weisel Partners Group
U.S. Bancorp
Wachovia
William Blair & Company

Firm Decisions and Variation in the Returns to College: Evidence from Employer Recruiting
Online Appendix

Russell Weinstein*

June 13, 2019

Data

There are 46 consulting firms listed in the 2007 Vault top 50 ranking by prestige. Four of these 46 are not in my sample, either because automated web crawlers were blocked, or the page was nonarchived, in all sample years. Deloitte Consulting and Watson Wyatt were not included because their pages could not be crawled by robots in any of the sample years. Towers Perrin was not included because robots could not crawl the pages listing the firm's locations. Strategic Decisions Group was not included because the pages were not archived in any of the sample years. I collect data for one firm not listed in the top 50 in 2007 because it split from a top 50 firm in 2008 (Booz), yielding a total of 43 consulting firms.

There are 43 banking firms in the 2008 Vault top 50 ranking by prestige of commercial banks and financial services companies. Data were not available for four firms: Goldman Sachs, Blackstone, Deloitte, or UBS. There were duplicate listings of two firms in the Vault ranking. There were two listings for JP Morgan (JP Morgan Investment Bank and JPMorgan Chase & Co.), and the data were collected for JP Morgan as a whole. There were also two listings for Citi (Citi Institutional Clients Group and Citigroup Inc.), and the data were collected for Citi as a whole. For three firms, recruiting pages were identified but missing recruiting or location information

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prevented their inclusion. KPMG says to contact the university regarding recruiting in each year. Wells Fargo has inconsistent location information in each year except 2004 and 2005, and in 2005 it says to contact the university while in 2004 the page is not archived. RBS does not give relevant location data, so this firm is not used in the analysis.

In the case of mergers or acquisitions, I collect the post-merger or post-acquisition target campuses if the original sample firm remains in the name of the new firm, or the target campuses can be separated from the parent firm. I collect the pre-merger target campuses for the original sample firm. This is relevant for Oliver Wyman and Hewitt.

From 2000-2002, Oliver Wyman existed as a firm. The firm was renamed Mercer Oliver Wyman in 2003. In 2006, Mercer Oliver Wyman merged with Mercer Management and Mercer Delta to form Oliver Wyman. The recruiting data for Oliver Wyman consists of the target campuses for Oliver Wyman from 2000-2002, for Mercer Oliver Wyman from 2003-2006, and Oliver Wyman from 2007 forward. Thus, for this firm I do not include the target campuses for the other companies that merged in 2006.

Hewitt was bought by Aon in October 2010, and a new firm Aon Hewitt was formed. The values of *Recruit* for Hewitt consist of Hewitt's target campuses through 2009, and Aon Hewitt's target campuses from 2010 forward. While PRTM retained its name after being acquired by PwC, the recruiting strategies could not be separated from PwC as a whole, which has many other divisions. I only collect data on recruiting strategies for PRTM through 2010, the year before it was acquired.

Appendix Table A1 shows the firms in the sample, the years in which each firm is in the sample, and the reason for any missing years. I define a firm to be in the sample if the firm is in the sample for at least one university that year. Firms may not be in the sample if they are missing location information or recruiting information, or if they have not yet been founded or have exited. There are several reasons why for a given firm $Recruit_{fjt}$ may be missing for some universities and not others. These include event dates listed as TBA, and nonworking university-specific links when others were accessible or clearly not attracting firms.[1]

Of the 73 firms, 44 are in the sample for at least half of the 14 sample years. Six

[1] A separate appendix with coding details, including why $Recruit_{fjt}$ is listed as missing in each case, is available upon request.

of the 42 consulting firms, and four of the 31 banking firms entered or exited during the sample period. $Recruit_{fjt}$ is set to missing for these firms in the years they were not active.

Calculating Distance Between Firms and Universities

I compute the lengths of the great circle arcs connecting each university and each office location for a given firm, located on the surface of a sphere. The arc length, measured in degrees, is then converted to statute miles as measured along a great circle on a sphere with radius 6371 kilometers, the mean radius of the earth. These calculations are performed using the *arclen* and *deg*2*sm* commands in MATLAB.

Calculating the Share of High-Scoring Students at a University

I test whether university characteristics change around the time of move ins or move outs. Among the variables I consider are the share of students scoring above 700 on the SAT Math or 30 on the ACT Math. I calculate this share using the 25th and 75th percentiles of the Math SAT and ACT score distribution for entering students from IPEDS. Assuming test scores are distributed normally, I obtain from the percentiles the mean and standard deviation of each test score distribution at each university. Using the normal CDF, and weighting by the percent of students reporting each exam, I calculate the percent at each university scoring above 700 on the Math SAT or above 30 on the Math ACT.[2] I determine the university's regional rank based on this percentage, where regions are defined using the Bureau of Economic Analysis OBE regions (combining New England and the Mideast).

[2]However, if the test score percentiles for a particular test are missing, I assume the weight on the non-missing test is one. Otherwise, I am implicitly assuming that the percent above the threshold on the missing test is zero. Any concerns that this places too much weight on the non-missing test are mitigated because the percent reporting the non-missing test when there is a test with missing percentiles is approximately 87%.

Robustness: Driving Distances

The principal distance measure is based on latitude and longitude. For robustness, I use driving distances from Google Maps for a subset of the firm/university pairs. Specifically, this information is collected for firm/university pairs that are in the regression sample and experience at least one move in or one move out, and for whom the distance is within 100 miles. I limit to the pairs within 100 miles as this is mainly a robustness check for how the effects of a move decay with distance (Figure 4). This yields 1291 university/office city pairs.

For each of these university/office city pairs, I use the distance from Google Maps between the university and the city hall of the firms' city. For cities where there is no city hall, I use distance from Google Maps between the university and the city name. I use the Google Maps distance associated with the shortest travel time. For all other pairs, I use the distance measure based on latitude and longitude. Appendix Figure A6 shows the equivalent of Figure 4 in the paper, instead using the Google Maps distance if it was collected.

Robustness: What do Firms Sacrifice for Proximity

The principal results use discrete bins of distance and selectivity tiers to evaluate how firms value proximity relative to selectivity. In this section, I present results using the proportion of high-test score students as a measure of selectivity, and a polynomial in distance. This allows me to more finely evaluate the proximity-selectivity tradeoff, for example the difference in selectivity needed to compensate the firm for recruiting further away.

First, I test how the effects of an office opening decay with distance between the firm and university after the move, controlling for university selectivity and the distance before the move. Specifically, I estimate:

$$\begin{aligned} Recruit_{fjt} = \alpha_0 + \alpha_{fj} + \delta_{ft} + \kappa_{jt} + \beta Post_{fjt} + \gamma Post_{fjt} * f(PostDist_{fj}) \\ + \rho Post_{fjt} * f(PreDist_{fj}) + \kappa Post_{fjt} * ln(Selectivity_j) + \epsilon_{fjt} \end{aligned} \quad (1)$$

Because there were not dramatic differences in short- and long-run effects, for sim-

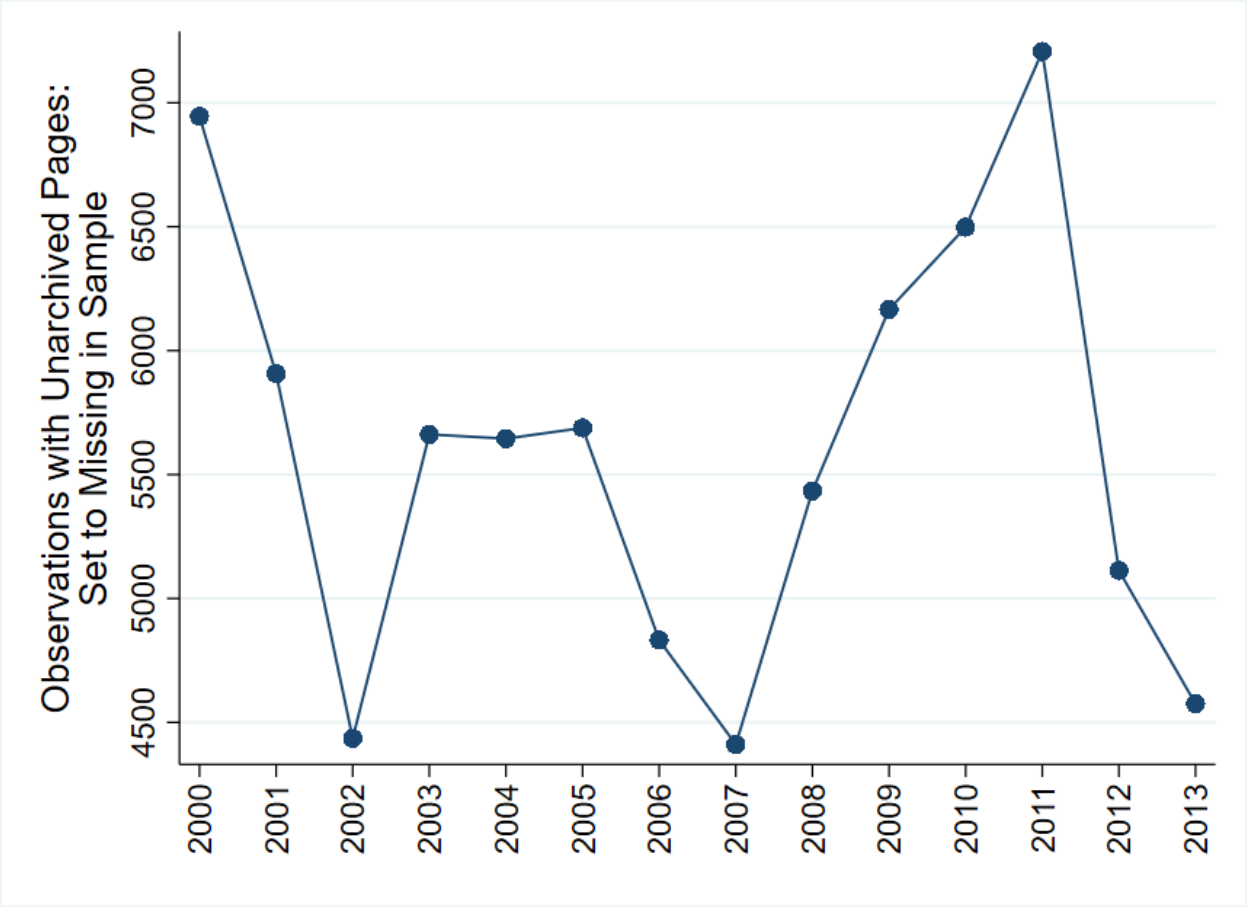
plicity I include only an indicator for the years following an opening. I interact *Post* with a cubic in firm-university distance after the move, and a cubic in firm-university distance before the move. Recall $Post_{fjt} = 1$ only if the firm-university distance after the move is less than 200 miles. The coefficients γ identify the differential effect of an office opening by distance after the move, conditional on opening an office within 200 miles of the university. I also interact *Post* with the log of the university's selectivity (in 2006). Selectivity is the proportion of students scoring above 700 on the SAT Math or 30 on the ACT math. I show the results in Appendix Figures A4 and A5 and Appendix Table A9.

Do Firms Adjust Recruiting Even if they have an Existing Target Campus Nearby? I use a similar specification to test how the effect of an office opening varies with distance between the firm's new location and its closest existing target. I estimate:

$$\begin{aligned} Recruit_{fjt} = \alpha_0 + \alpha_{fj} + \delta_{ft} + \kappa_{jt} + \beta Post_{fjt} + \gamma Post_{fjt} * f(PostDist_{fj}) \\ + \rho Post_{fjt} * f(ClosestTargetDist_{fj}) + \kappa Post_{fjt} * ln(Selectivity_j) + \epsilon_{fjt} \end{aligned} \tag{2}$$

This is similar to regression (1) but includes a cubic in distance between the firm and the closest existing target, rather than the firm-university distance before the move. I show the results in Appendix Figure A5 and Appendix Table A9.

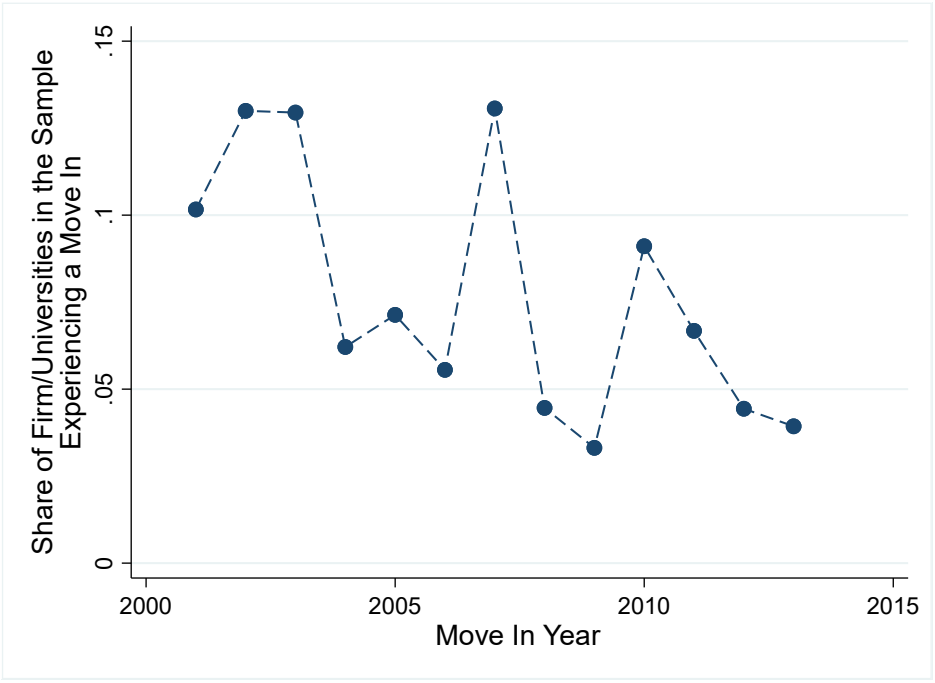
Appendix Figure A1: Observations with Unarchived Pages by Year



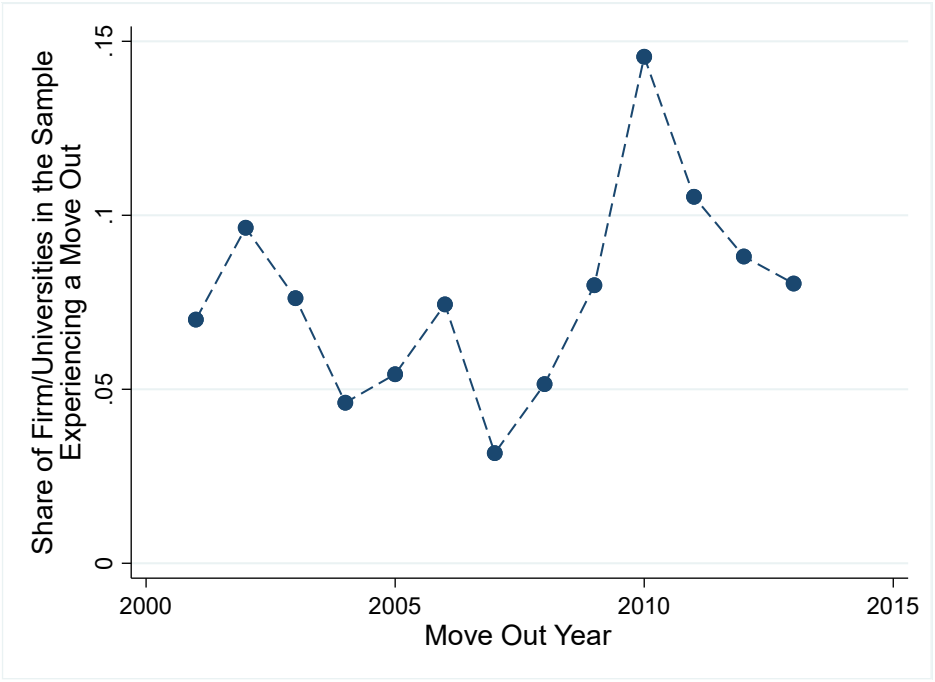
Note: This plot shows the number of firm/university pairs in each year whose recruiting page was not archived. I set the *Recruit* variable equal to missing for these observations.

Appendix Figure A2: Office Openings and Closings by Year

(a) Office Openings by Year



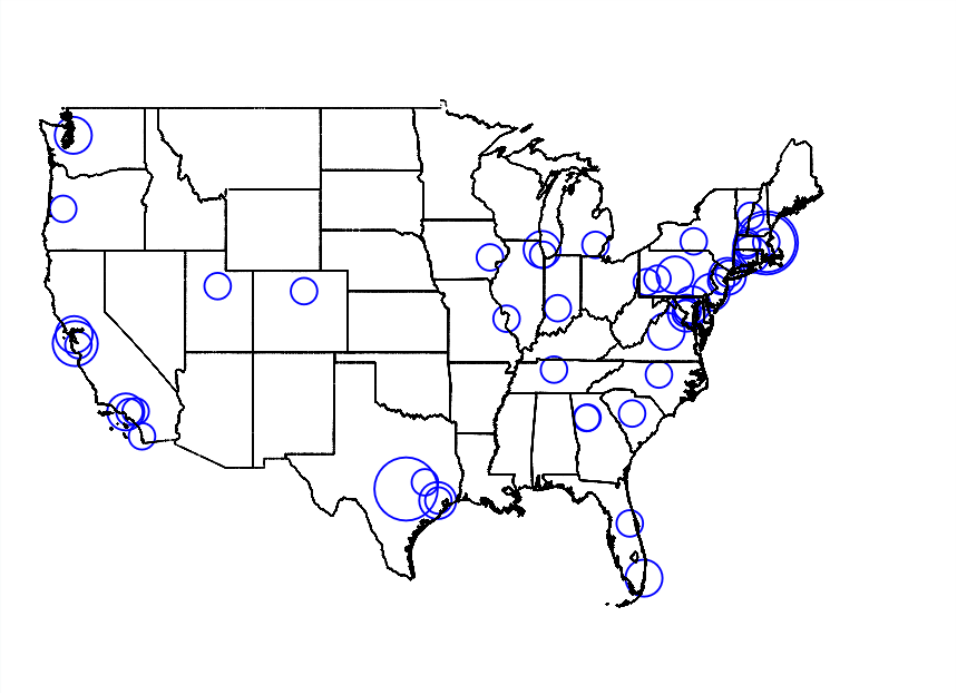
(b) Office Closings by Year



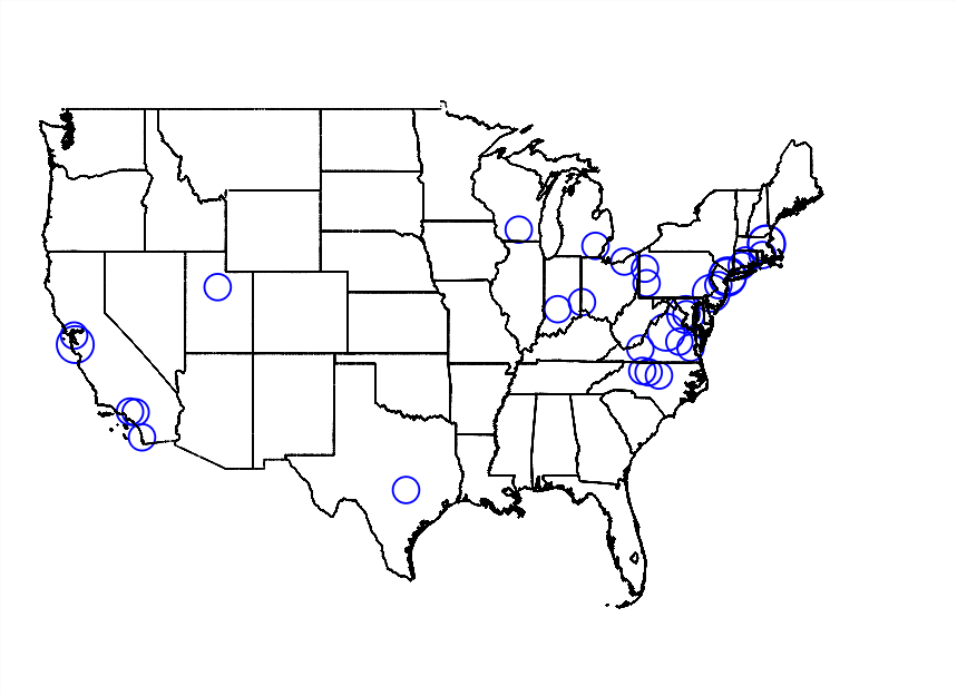
Note: These figures show histograms of the year in which firm/university pairs experience openings (a) and closings (b) among the pairs in the sample that experience openings (a) and closings (b). I limit to the first move in and first move out experienced by each firm/university pair. See text for details.

Appendix Figure A3: Changes in Recruiting Following Office Openings and Closings

(a) Universities Attracting Recruiting Firms After Nearby Office Openings



(b) Universities Losing Recruiting Firms After Nearby Office Closings

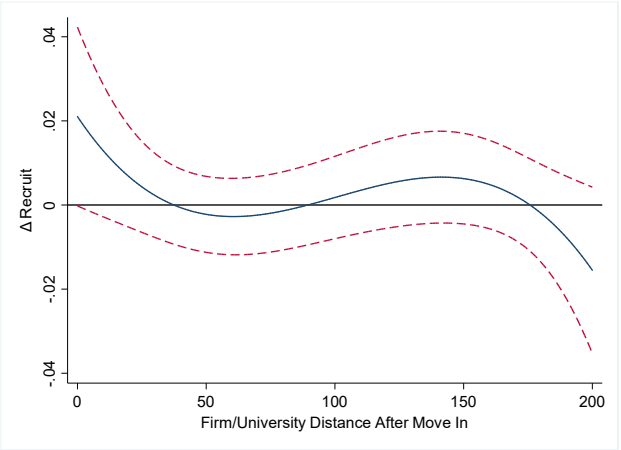


Note: Plot (a) shows the universities that began attracting a recruiting firm within five years of a nearby office opening, but had not attracted this firm before the office opening. Plot (b) shows the universities that had attracted the firm at least once before it closed its local office, but did not attract the firm at least once after the office closing. See text for details.

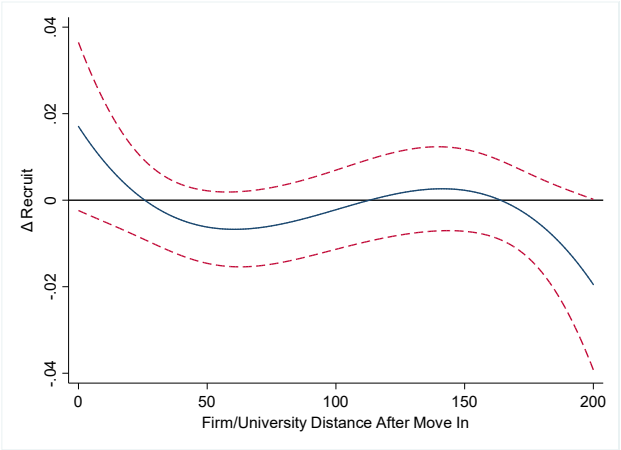
Appendix Figure A4: Effect of Geographic Distance on Recruiting Decisions, and the Decay with Distance

Effect of Nearby Office Openings on Recruiting, by Firm-University Distance After the Move

(a) Median-Selectivity Universities

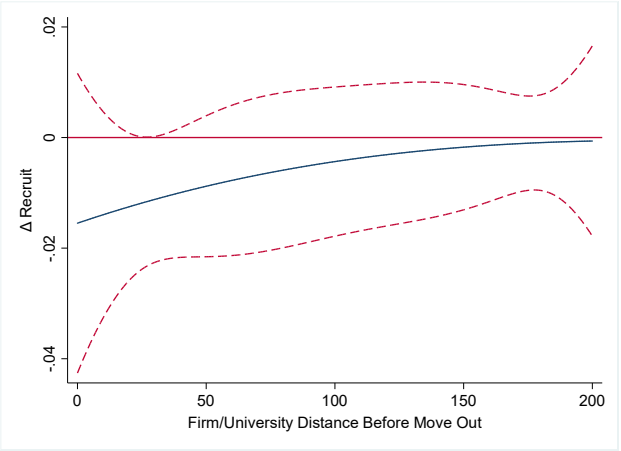


(b) University Selectivity at the 25th Percentile

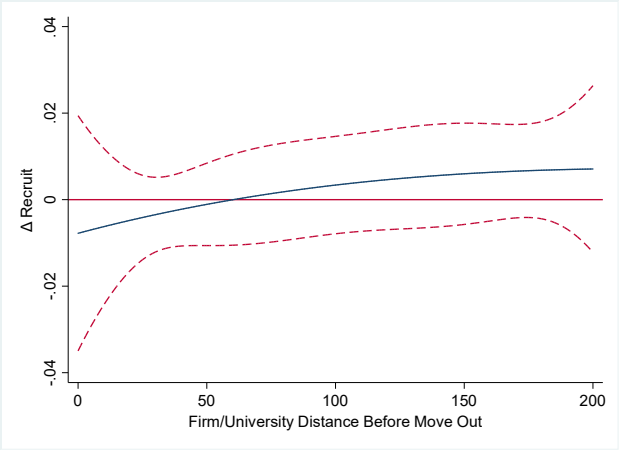


Effect of Nearby Office Closings on Recruiting by Firm-University Distance Before the Move

(c) Median-Selectivity Universities



(d) University Selectivity at the 25th Percentile

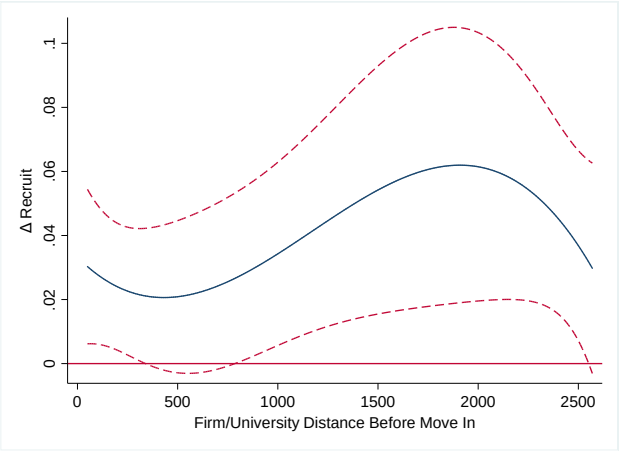


Note: Plots show linear combinations of regression coefficients for median (a and c), or 25th percentile (b and d) selectivity universities, whose pre-move-in (a and b) or post-move-out (c and d) distance was at the median for the sample, for different levels of the post-move-in (a and b) or pre-move-out (c and d) distance. Regressions include firm-university, firm-urban area of closest office-year, and university-year fixed effects, an indicator for post-move, and this indicator interacted with a cubic in pre-move distance, a cubic in post-move distance, and ln(university selectivity). Dotted lines are 95% confidence intervals for these combinations. See paper for details.

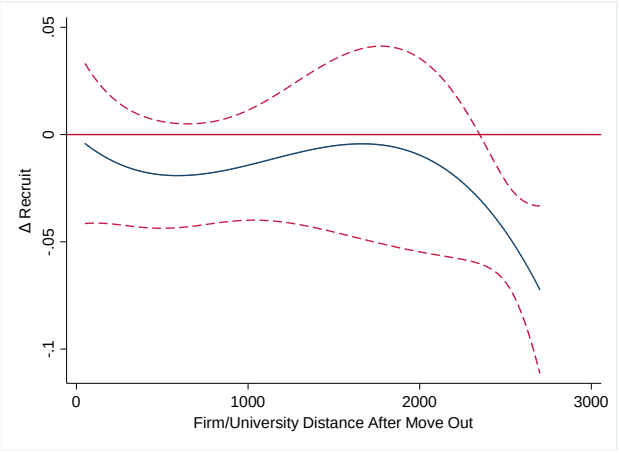
Appendix Figure A5

Effect of Nearby Office Changes on Recruiting, by Firm-University Distance

(a) Before the Office Opening

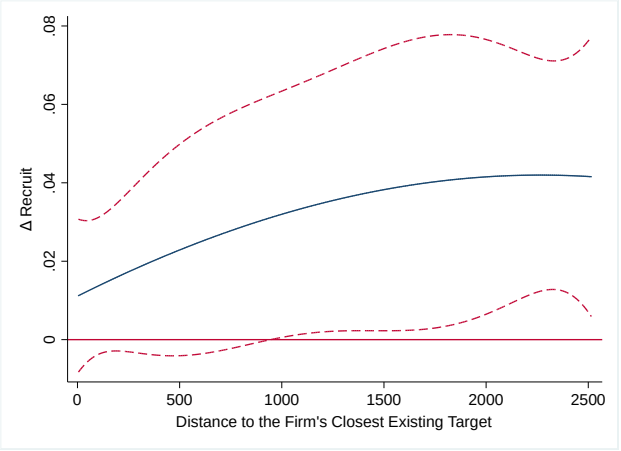


(b) After the Office Closing

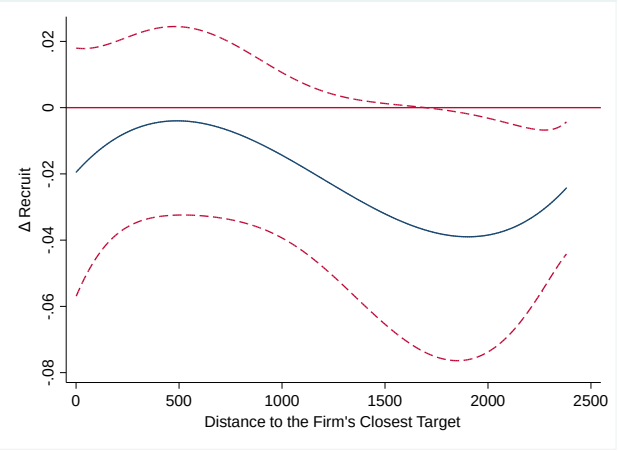


Effect of Nearby Office Changes on Recruiting, by Firm Distance to its Closest Existing Target Campus

(c) After Office Openings

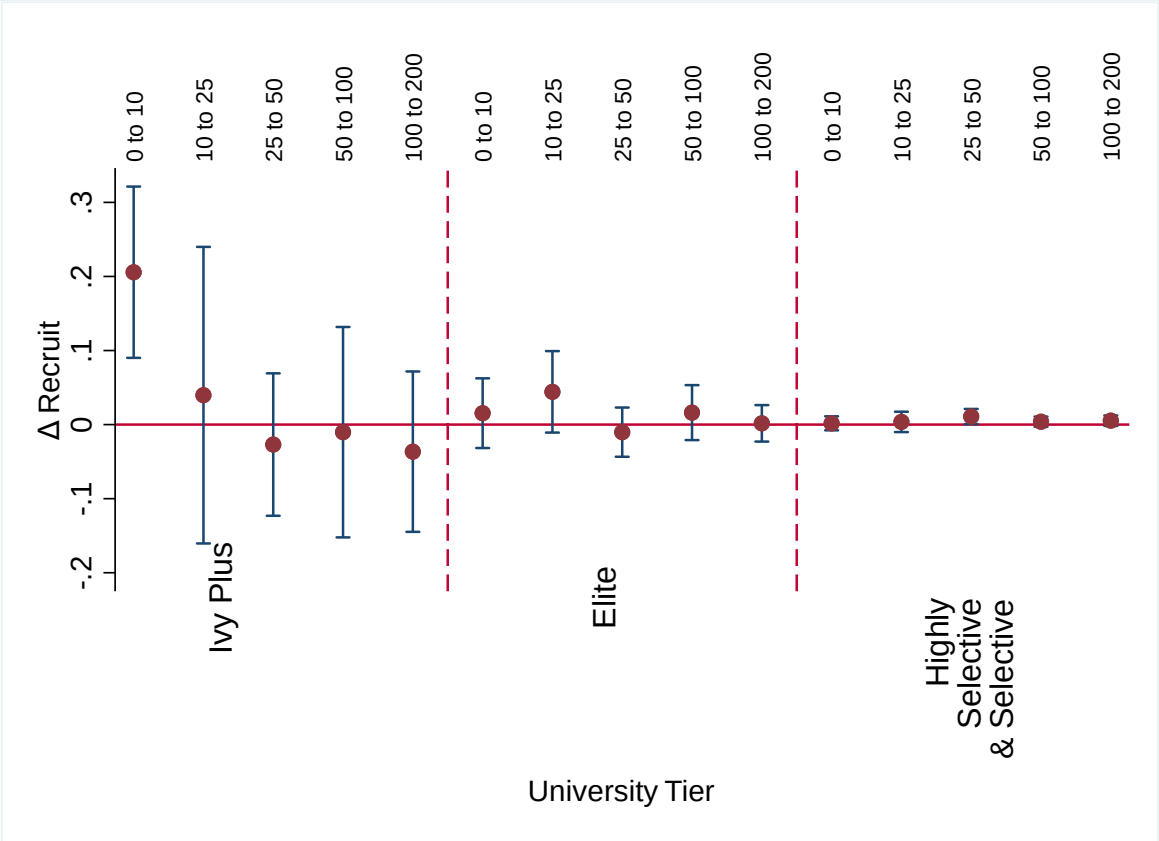


(d) After Office Closings



Note: Plots (a) and (b) show linear combinations of regression coefficients for median selectivity universities, whose post-move-in (a) or pre-move-out (b) distance was zero, for different levels of the pre-move-in (a) or post-move-out (b) distance. Regressions include firm-university, firm-urban area of closest office-year, and university-year fixed effects, an indicator for post-move, and this indicator interacted with a cubic in pre-move distance, a cubic in post-move distance, and ln(university selectivity). These regressions are the same as those described in Appendix Figure A4. Plots (c) and (d) show linear combinations of regression coefficients for 25th-percentile-selectivity universities, whose post-move-in (c) or pre-move-out (d) distance was 10 miles, for different levels of distance between the firm and its closest existing target campus to its new location. Regressions include firm-university, firm-year, and university-year fixed effects, an indicator for post-move, and this indicator interacted with a cubic in post-move distance (c) or pre-move distance (d), a cubic in distance between the new office location and the closest existing target campus, and ln(university selectivity). Dotted lines are 95% confidence intervals for these combinations. See paper for details.

Appendix Figure A6: Effect of Nearby Office Openings, by Post-Move Distance using Driving Distance



Note: This plot is equivalent to Figure 4 in the paper, but uses driving distances from Google Maps for firm/university pairs that experienced a move in, and were within 100 miles of each other using distance based on latitude and longitude. For all other pairs, I use distance based on latitude and longitude. See appendix and Figure 4 for details.

Appendix Table A1: Firms in Sample, by Year

	Total Years in Sample	Years in Sample	Reason missing years?	Vault Rank
Consulting Firms				
Marakon	13	2000-2001, 2003-2013	Contact university	12
Oliver Wyman	13	2001-2013	No page archived	7
Parthenon Group	13	2000-2006, 2008-2013	Contact university	9
First Manhattan Consulting Group	12	2000-2008, 2010-2012	No page archived	35
Gallup	12	2000-2003, 2005, 2007-2013	No page archived	38
Huron Consulting Group	12	2002-2013	Formed in 2002	47
Mars & Co.	12	2000-2003, 2005-2011, 2013	No page archived	25
Putnam Associates	12	2000-2009, 2011-2012	No page archived	46
The Boston Consulting Group	12	2001-2005, 2007, 2009-2013	2006: Singleton 2008: No page archived	2
ZS Associates	12	2000-2005, 2007-2012	No page archived	28
Dean & Company	11	2000-2009, 2011	2010: No location, 2012-2013: No page archived	41
Gartner Inc.	11	2000-2002, 2004, 2007-2013	No page archived	15
Giuliani Partners	11	2002-2008, 2010-2013	Formed in 2002	42
Mitchell Madison Group	11	2003-2013	No website found	48
NERA Economic Consulting	11	2000, 2003, 2005-2013	Blocked Robots	22
PRTM	11	2000-2010	Acquired by PwC in 2011	43
A. T. Kearney	10	2004, 2006-2013	2000: No page archived, 2001-2003: Contact firm, 2005: Singleton	14
Bain & Company	10	2000-2007, 2011-2012	No page archived	3
Corporate Executive Board	10	2000-2008, 2010	Error loading page	34
Arthur D. Little	9	2003-2008, 2010, 2012-2013	No page archived	30
Cornerstone Research	9	2000-2004, 2006, 2008, 2011-2012	Blocked Robots	33
Hewitt Associates	9	2000-2004, 2006-2009	2005: No page archived, 2010: Data combined with Aon	18
PA Consulting Group	9	2003-2005, 2007, 2009-2013	No page archived	49
Roland Berger	9	2001-2002, 2006-2009, 2011-2013	No page archived	17
Analysis Group	8	2006-2013	Error loading page	40
Kurt Salmon	8	2000, 2005-2011	2001: Contact university 2002-2004: Error loading website	36
L. E. K. Consulting	8	2001-2008	Blocked Robots	11

	Total Years in Sample	Years in Sample	Reason missing years?	Vault Rank
Booz Allen Hamilton	7	2000, 2007-2009, 2011-2013	Error loading page	4
FTI Consulting	7	2004-2007, 2009, 2012-2013	2001-2003, 2008: Error loading page 2010-2011: Contact university	50
OC&C Strategy Consultants	7	2004-2007, 2011-2013	2000-2003: Broken links; 2008: Contact university; 2009-2010: No page archived	45
Stern Stewart & Co.	7	2001-2006, 2010	No page archived	37
Booz & Company	6	2008-2013	Split from Booz Allen Hamilton in 2008	NR
Cambridge Associates	6	2000-2001, 2009-2011, 2013	No page archived	23
McKinsey & Company	6	2007-2009, 2011-2013	2001-2002: Contact University 2004-2006: Blocked Robots	1
Navigant	6	2005-2007, 2010, 2012-2013	Blocked Robots	32
Charles River Associates	5	2000-2001, 2010, 2012-2013	Error loading page	24
Advisory Board	4	2000, 2002, 2012-2013	No page archived	
LECG Corporation	4	2000, 2008-2010	Liquidated in March, 2011	29
Capgemini	3	2002, 2004, 2013	Contact university	13 (27?)
Mercer	3	2004, 2006, 2008	2000-2003: No page archived; 2007, 2009-2013: No Location;	8
Monitor Group	3	2000, 2011-2012	Acquired by Deloitte in January, 2013	5
Accenture	2	2012-2013	Contact university	16
Banks				
Jefferies & Company	14	2000-2013		22
Keefe Bruyette & Woods	14	2000-2013		38
Gleacher & Company	13	2000-2005, 2007-2013	2006: No location	45
Morgan Keegan & Co.	12	2001-2012	2000, 2013: No location	44
Raymond James Financial	12	2000-2002, 2004-2010, 2012-2013	2003, 2011: No page archived	41
Lazard	11	2000-2010	2011-2013: Contact university	8
U.S. Bancorp	11	2002-2004, 2006-2013	2000-2001: No page archived	46
Citi	10	2000-2009	2010-2011: Blocked Robots 2012-2013: No page archived	7 (13)
Evercore Partners	10	2000-2006, 2010-2012	2007-2009: No page archived	25
HSBC	10	2004-2013	2000-2001: No page archived 2002-2003: No page archived	20
Morgan Stanley	10	2001-2002, 2005-2009, 2011-2013	2000: No page archived 2003-2004: Error loading page 2010: No page archived	3
Macquarie Group	9	2000-2004, 2006-2009	2005: Contact university	47

	Total Years in Sample	Years in Sample	Reason missing years?	Vault Rank
Piper Jaffray Companies	9	2000-2005, 2007, 2010, 2012	2006, 2008-2009, 2011: No page archived	27
Rothschild	9	2002-2003, 2005-2008, 2011-2013	2000-2001: Error loading page 2009-2010: Blocked robots	19
ABN AMRO	8	2000-2007	2007: Acquired	40
Greenhill & Co.	8	2006-2013	2000-2005: No page archived	16
Wachovia	8	2000-2007	2008: Acquired by Wells Fargo	18
Cowen Group	7	2000-2006	2007-2010: No page archived 2011-2012: Contact university 2013: No page archived	39
Deutsche Bank	7	2001-2003, 2008-2011	2000, 2004-2007, 2012-2013: No page archived	12
William Blair & Company	7	2001-2004, 2006, 2012-2013	2000: No location 2005: Mentions recruiting, but says positions filled 2007-2011: No page archived	36
Allen & Company	6	2007-2008, 2010-2013	2000-2006, 2009: No page archived	33
Brown Brothers Harriman	6	2000-2005	2006-2013: No page archived	37
Perella Weinberg Partners	6	2006-2009, 2012-2013	Founded in 2006 2010-2011: Contact university	23
Barclays	5	2009-2013	2000-2008: No US locations	17
BNP Paribas	5	2001-2002, 2006-2007, 2013	2000: Error loading page 2003-2005, 2008-2012: No page archived	34
Robert W. Baird & Co.	5	2007-2011	2000-2006: No page archived 2012-2013: Contact university	42
Bank of America	4	2006-2007, 2012-2013	2000-2005, 2008, 2010: No location	15
JP Morgan Chase & Co.	3	2000, 2006-2007	2001-2002: No page archived 2003: No Location 2004: No page archived 2005, 2008-2010: No page archived 2011-2013: Blocked robots	5 (11)
Houlihan Lokey	2	2007, 2009	2000-2005, 2010-2013: No location 2008: Page unarchived	21
RBC Capital Markets	2	2012-2013	2000-2001: No website found 2002-2005: No location 2006-2009: No page archived 2010-2011: No page archived	29
Thomas Weisel Partners Group	2	2008-2009	2000-2007: No location 2010: Acquired by Stifel Financial	28

	Total Years in Sample	Years in Sample	Reason missing years?	Vault Rank

Note: The explanation "No page archived" may reflect that there is no recruiting page at all or that the archived recruiting page does not have the necessary information (i.e. discusses recruiting but not specific target campuses). The explanation "No location" may reflect that the firm's locations were unarchived, or inconsistencies in how/what type of locations were reported. The explanation "Contact university" reflects that the firm tells interested students to contact their university to determine if the firm recruits on their campus. The explanation "Blocked robots" reflects that the site blocked access to automated web crawlers. The explanation "Singleton" reflects there was only one observation for the firm in that year. Vault Rank is the rank from 2007 for consulting firms, and from 2008 for banking firms because the 2007 banking ranking contained very few firms. The question mark in the rank cell for Capgemini is because the firm was included twice in the rankings.

Appendix Table A2: The Effect of Office Openings and Closings on Recruiting at Local Universities

Outcome: Recruit		
Panel A: Move Ins		
(*t=t**)*Move*		0.005*
	Pairs with data: 2705	(0.002)
(*t=t* + 1*)*Move*		0.012***
	Pairs with data: 2261	(0.003)
(*t=t* + 2*)*Move*		0.013***
	Pairs with data: 1641	(0.004)
(*t=t* + 3*)*Move*		0.014***
	Pairs with data: 1790	(0.004)
(*t=t* + 4*)*Move*		0.008
	Pairs with data: 1416	(0.005)
(*t=t* + 5*$^{+}$)*Move*		0.009**
	Pairs with data: 1705	(0.004)
(*t=t* - 2*)*Move*		0.001
	Pairs with data: 1875	(0.002)
(*t=t* - 3*)*Move*		-0.002
	Pairs with data: 1382	(0.002)
(*t=t* - 4*)*Move*		0.002
	Pairs with data: 1265	(0.002)
(t=t - 5*$^{+}$*)Move*		0.007
	Pairs with data: 1726	(0.005)
Observations		202,732
R-Squared		0.638
Panel B: Move Outs		
(*t=t**)*Move*		-0.002
	Pairs with data: 1476	(0.003)
(*t=t* + 1*)*Move*		0.000
	Pairs with data: 1246	(0.004)
(*t=t* + 2*)*Move*		-0.005
	Pairs with data: 1011	(0.005)
(*t=t* + 3*)*Move*		-0.010*
	Pairs with data: 863	(0.005)
(*t=t* + 4*)*Move*		-0.013**
	Pairs with data: 702	(0.006)
(*t=t* + 5*$^{+}$*)Move*		-0.018**
	Pairs with data: 577	(0.008)
(*t=t* - 2*)*Move*		0.006*
	Pairs with data: 1107	(0.004)
(*t=t* - 3*)*Move*		0.006
	Pairs with data: 807	(0.006)
(*t=t* - 4*)*Move*		0.003
	Pairs with data: 628	(0.005)
(t=t - 5*$^{+}$*)Move*		0.002
	Pairs with data: 887	(0.005)
Observations		193,613
R-Squared		0.641

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the firm level. Regressions include firm-university, firm-year, and university-year fixed effects. The variable *t = t** indicates the move year. Below each variable, I list the number of firm/university pairs with that variable equal to one. In the year preceding the move there are 2300 firm/university pairs for move ins, and 1531 pairs for move outs. See Table 2 and text for details.

Appendix Table A3: Office Openings and Closings and Recruiting at Local Universities: Heterogeneity

Outcome: Recruit	(1)	(2)	(3)	(4)	(5)	(6)
			Panel A: Move Ins			
Post Move, Short Run	0.007*	0.006	0.011**	0.003	0.009***	0.013**
	(0.003)	(0.004)	(0.004)	(0.004)	(0.002)	(0.006)
Post Move, Long Run	0.009**	0.005	0.009	0.007	0.007*	0.010
	(0.003)	(0.006)	(0.006)	(0.005)	(0.004)	(0.012)
Observations	52,722	147,852	117,892	84,840	48,385	65,525
R-Squared	0.684	0.632	0.683	0.580	0.729	0.684
			Panel B: Move Outs			
Post Move, Short Run	-0.007	-0.006	-0.011**	-0.000	-0.012**	-0.005
	(0.013)	(0.004)	(0.005)	(0.004)	(0.005)	(0.007)
Post Move, Long Run	-0.028**	-0.017*	-0.023**	-0.009	-0.014**	-0.029*
	(0.010)	(0.009)	(0.009)	(0.012)	(0.006)	(0.016)
Observations	49,678	141,892	112,443	81,170	45,425	63,036
R-Squared	0.683	0.638	0.685	0.592	0.732	0.688
Firms	High Rank	Low Rank	Consulting	Banking	High Travel	Low Travel

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the firm level. All regressions include firm/university pair fixed effects, firm-year fixed effects, and university-year fixed effects. The variable *Post Move, Short Run* is an indicator for the year of the move, and the four years following the move event *(t*, t*+1, t*+2, t*+3, t*+4)* . The variable *Post Move, Long Run* is an indicator for five or more years following the move. See Table 2 for definition of move ins and move outs. Column 1 includes only firms whose Vault ranking by industry was among the ten highest (best) of the firms in that industry in the sample. Column 2 includes only the firms with lower Vault rankings. Column 3 includes only consulting firms, while column 4 includes only banking firms. Column 5 includes consulting firms denoted as requiring extensive travel, while column 6 includes consulting firms denoted as requiring less extensive travel. See text for details.

Appendix Table A4: Extent of Travel at Consulting Firms in the Sample

Firms Requiring Extensive Travel or with Global Staffing	Firms Requiring Less Extensive Travel or with Local Staffing
McKinsey & Company	Bain & Company
The Boston Consulting Group	Mercer
Booz & Company	A. T. Kearney
Monitor Group	Parthenon Group
Oliver Wyman	Navigant
Huron Consulting Group	ZS Associates
First Manhattan Consulting Group	NERA Economic Consulting
Marakon	Hewitt Associates
Mars & Co.	Cornerstone Research
PRTM	Cambridge Associates
Mitchell Madison Group	Charles River Associates
Gartner Inc.	Corporate Executive Board
Arthur D. Little	The Advisory Board Company
Kurt Salmon	Analysis Group
Stern Stewart & Co.	Gallup
Capgemini	Putnam Associates
Accenture	Dean & Company
	Roland Berger
	L. E. K. Consulting
	Booz Allen Hamilton
	FTI Consulting
	OC&C Strategy Consultants
	LECG Corporation
	PA Consulting Group

Notes: Designations are based on firm websites, Vault.com, and both of these sites accessed through The Wayback Machine. Local staffing refers to assigning cases to consultants in the area of their local offices. Global staffing refers to case assignments that do not depend on the location of the consultant's home office. The particular texts which determined these designations are available from the author upon request. See text for details.

Appendix Table A5: The Effect of Office Openings and Closings on Recruiting at Local Universities: Quadratic in Distance

Outcome: Recruit	
Distance	-0.0019**
	[0.0009]
Distance^2	0.00005
	[0.00003]
Effect of Moving ≈348 miles closer, to a distance of ≈70 miles	
	0.0063**
	[.003]
Effect of Moving ≈639 miles closer, to a distance of ≈70 miles	
	0.0115**
	[.005]
N	210,933
R-squared	0.6327

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the firm level. All regressions include firm/university pair fixed effects, firm-year fixed effects, and university-year fixed effects. Distance denotes the distance between the university and the firm's closest office to the university. Moving 348 miles closer is the 75th percentile of distance differences among universities experiencing firms moving closer. Moving 639 miles is the 90th percentile of distance differences among universities experiencing firms moving closer. Distance between firm and university of 70 miles is the 25th percentile of distance among firm/university pairs experiencing the firm moving closer to the university. See text for details.

Appendix Table A6: The Effect of Office Openings and Closings on Recruiting at Local Universities, Robustness and Heterogeneity

	Outcome: Recruit	(1)	(2)	(3)
	Panel A: Move Ins			
(1)	Post Move, Short Run	0.012***	0.012***	0.008*
		(0.004)	(0.004)	(0.005)
(2)	Post Move, SR*New Office in Big City			-0.001
				(0.006)
(3)	Post Move, Long Run	0.010*	0.011*	0.008
		(0.006)	(0.006)	(0.005)
(4)	Post Move, LR*New Office in Big City			-0.000
				(0.008)
	Observations	139,171	139,171	202,732
	R-Squared	0.695	0.695	0.637
	Panel B: Move Outs			
(1)	Post Move, Short Run	-0.009*	-0.009*	-0.003
		(0.005)	(0.005)	(0.004)
(2)	Post Move, SR*Closed Office in Big City			-0.007
				(0.006)
(3)	Post Move, Long Run	-0.022***	-0.022***	-0.010*
		(0.007)	(0.007)	(0.005)
(4)	Post Move, LR*Closed Office in Big City			-0.013
				(0.011)
	Observations	132,840	132,840	193,613
	R-Squared	0.700	0.699	0.641
	University Characteristics	Y	N	N

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the firm level. Regressions in columns 1 and 2 include firm/university pair fixed effects and firm/year fixed effects, and include only years including and after 2004. See Appendix Table A12 for university characteristics included as controls in column 1. To avoid dropping observations missing one of the control variables, I set missing values to a common value and include an indicator for whether the observation is missing the value for that variable. Regressions in column 3 include firm/university pair fixed effects, firm/year fixed effects, and university/year fixed effects. I define big cities as cities in an urban area with population above 3.06 million (the 25th percentile for pairs in the regression sample experiencing move ins). See notes to Table 2 for description of the Post Move variables, and see text for further details.

Appendix Table A7: Office Openings and Closings and Changes in the Urban Area

	(1)	(2)
	# Sample Firm Offices in Urban Area of	
Outcome:	City Experiencing the Move	
Post Move, Short Run	1.132***	-0.408
	(0.417)	(0.656)
Post Move, Long Run	1.244	-1.835
	(0.850)	(1.747)
Observations	27,262	12,410
R-Squared	0.987	0.989
Move	Move In	Move Out

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the firm level. Regressions include only firm/university pairs that eventually experience a move. The dependent variable is the number of sample firm offices in the urban area corresponding to the city into which the firm moves and Post Move becomes one for the pair (column 1), or away from which the firm moves and Post Move afterward becomes one for the pair (column 2). All regressions include firm/university pair fixed effects and year fixed effects. The variable *Post Move, Short Run* is an indicator for the year of the move, and the four years following the move event *(t*, t*+1, t*+2, t*+3, t*+4)* . The variable *Post Move, Long Run* is an indicator for five or more years following the move. See Table 2 for definition of move ins and move outs.

Appendix Table A8: Selectivity of New Target Campuses Relative to the Firm's Median Target Campus

Y = Selectivity - Selectivity of Firm's Median Target	(1)	(2)	(3)	(4)	(5)	(6)
New Office in Big City	0.176***	0.188***	0.00288			
	(0.0616)	(0.0610)	(0.0899)			
Distance Between New Office and Closest Existing Target		-0.0115**	-0.00825*			
		(0.00548)	(0.00462)			
# Firms with Office in Same Urban Area as New Office			0.00538***			
			(0.00189)			
Ln(Urban Area Population) for New Office				0.0909***	0.0920***	0.0266
				(0.0302)	(0.0297)	(0.0677)
Ln(Distance Between New Office and Closest Existing Target)					-0.0518**	-0.0481*
					(0.0259)	(0.0264)
Ln(# Firms with Office in Same Urban Area as New Office)						0.0753
						(0.0613)
No Existing Target Campus		-0.0188	-0.00800		-0.285	-0.266
		(0.0635)	(0.0593)		(0.173)	(0.178)
Constant	-0.171***	-0.142**	-0.182***	-1.419***	-1.164**	-0.424
	(0.0532)	(0.0652)	(0.0656)	(0.456)	(0.471)	(0.850)
Observations	83	83	83	83	83	83
R-squared	0.067	0.106	0.200	0.091	0.132	0.154

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Sample includes firm/university pairs that never attracted the firm before the move, but attracted the firm at least once after the move. These firm/university pairs are included in the year the firm started to recruit at the university. Big city equals one if the city population is greater than or equal to the 25th percentile of the post-move regression sample (3.06 million people). Number of firms with office in same urban area as new office refers to the number of firms in the sample (combining finance and consulting firms) with offices in the same urban area as the firm's new office. See text for details.

Appendix Table A9: The Effect of Office Openings and Closings on Recruiting at Local Universities, by a Continuous Measure of Distance

Panel A: Y = *Recruit*	Move Ins		Move Outs	
Post Move	0.045**	0.047**	-0.022	-0.030
	(0.018)	(0.021)	(0.021)	(0.038)
Post Move*ln(Selectivity)	0.005*	0.008*	-0.009**	-0.002
	(0.003)	(0.005)	(0.004)	(0.004)
Interactions with Distance when Proximity = 1				
Post Move*Distance when Proximity = 1	-0.001**	-0.001*	-7.04e-05	3.945e-04
	(0.000)	(0.001)	(5.72e-05)	(1.213e-03)
Post Move*(Distance when Proximity = 1)^2	1.08e-05**	1.35e-05	8.08e-08	1.41e-07
	(4.16e-06)	(8.59e-06)	(6.47e-08)	(1.36e-05)
Post Move*(Distance when Proximity = 1)^3	-3.57e-08**	-4.05e-08	-2.392e-11	-9.04e-09
	(1.38e-08)	(2.84e-08)	(1.783e-11)	(4.29e-08)
Interactions with Distance when Proximity = 0				
Post Move*Distance when Proximity = 0	-6.33e-05		1.583e-04	
	(5.63e-05)		(5.534e-04)	
Post Move*(Distance when Proximity = 0)^2	8.99e-08		-5.17e-07	
	(6.25e-08)		(5.96e-06)	
Post Move*(Distance when Proximity = 0)^3	-2.561e-11		4.86e-10	
	(1.701e-11)		(1.84e-08)	
Interactions with Distance to Closest Existing Target				
Post Move*Distance to Closest Target		2.61e-05		6.95e-05
		(5.14e-05)		(6.18e-05)
Post Move*(Distance to Closest Target)^2		-5.00e-09		-8.91e-08
		(5.60e-08)		(7.07e-08)
Post Move*(Distance to Closest Target)^3		-2.251e-13		2.482e-11
		(1.547e-11)		(1.964e-11)
Observations	198,905	182,278	189,969	181,668
R-squared	0.647	0.641	0.649	0.644

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered at the firm level in parentheses. Regressions for columns (1) and (3) include firm-university, firm-urban area of closest office-year, and university-year fixed effects, an indicator for post-move, and this indicator interacted with a cubic in pre-move distance (Proximity = 0 for Move Ins, and Proximity = 1 for Move Outs), a cubic in post-move distance (Proximity = 1 for Move Ins and Proximity = 0 for Move Outs), and ln(university selectivity). Regressions for columns (2) and (4) include firm-university, firm-year, and university-year fixed effects, an indicator for post-move, and this indicator interacted with a cubic in distance to closest existing target campus, and interacted with a cubic in distance when proximity = 1, and interacted with ln(selectivity). Sample sizes fall when analyzing distance to closest target because not all firms have existing targets at the time of a move. See text for details.

Appendix Table A10: On-Campus Access to Recently Relocated Firms at Graduation, and the Effect on Reaching the Top 1% of Incomes at 30-34 Years Old

	Income in Top 1%, Conditional on Parents in Quintile								
	1	1	1	2	2	2	3	3	3
Cumulative New Offices Opening within 10 Miles	0.0008	0.0020	0.0069	0.0020*	0.0020	0.0068	-0.0014**	-0.0019	-0.0039
	(0.0013)	(0.0024)	(0.0046)	(0.0010)	(0.0028)	(0.0056)	(0.0007)	(0.0016)	(0.0042)
Firms Recruiting After Moving within 10 Miles	0.0099***	0.0135***	0.0185**	0.0004	-0.0003	-0.0033	0.0027	0.0017	-0.0048
	(0.0037)	(0.0044)	(0.0085)	(0.0033)	(0.0058)	(0.0066)	(0.0023)	(0.0035)	(0.0050)
N	1,601	1,136	1,136	1,601	1,136	1,136	1,601	1,136	1,136
R-squared	0.7072	0.8174	0.8734	0.7956	0.8560	0.9025	0.8584	0.8945	0.9242
Mean of Dependent Variable	0.0316	0.0340	0.0340	0.0326	0.0358	0.0358	0.0345	0.0380	0.0380
University Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
University Tier-Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
CZ-Year Fixed Effects	N	Y	Y	N	Y	Y	N	Y	Y
University Trends	N	N	Y	N	N	Y	N	N	Y

	Income in Top 1%, Conditional on Parents in Quintile					
	4	4	4	5	5	5
Cumulative New Offices Opening within 10 Miles	0.0010	0.0000	-0.0017	0.0005	0.0006	-0.0003
	(0.0007)	(0.0015)	(0.0035)	(0.0005)	(0.0011)	(0.0018)
Firms Recruiting After Moving within 10 Miles	-0.0005	0.0016	-0.0021	0.0030**	0.0033*	0.0002
	(0.0017)	(0.0029)	(0.0059)	(0.0013)	(0.0018)	(0.0036)
N	1,601	1,136	1,136	1,601	1,136	1,136
R-squared	0.9154	0.9344	0.9519	0.9723	0.9824	0.9887
Mean of Dependent Variable	0.0381	0.0416	0.0416	0.0555	0.0596	0.0596
University Fixed Effects	Y	Y	Y	Y	Y	Y
University Tier-Year Fixed Effects	Y	Y	Y	Y	Y	Y
CZ-Year Fixed Effects	N	Y	Y	N	Y	Y
University Trends	N	N	Y	N	N	Y

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the university level. Dependent variable is the probability students are in the top 1% of the income distribution in 2014 for their birth cohort, conditional on parents' income in the given quintile. This variable is measured at the university x cohort level, and is from the *mobility report cards* (Chetty et al. 2017). The explanatory variables capture recruiting outcomes on their campus when these students were 22 years old. Observations are weighted by the count in the university x cohort cell. See text for details.

Appendix Table A11: On-Campus Access to Recently Relocated Firms at Graduation, and the Effect on Reaching the Top Income Quintile at 30-34 Years Old

	Income in Top Quintile, Conditional on Parents in Quintile								
	1	1	1	2	2	2	3	3	3
Cumulative New Offices Opening within 10 Miles	-0.0011	0.0038	0.0015	0.0001	0.0014	0.0114	-0.0004	0.0045	0.0029
	(0.0033)	(0.0052)	(0.0123)	(0.0031)	(0.0061)	(0.0149)	(0.0022)	(0.0038)	(0.0076)
Firms Recruiting After Moving within 10 Miles	0.0115	0.0106	-0.0002	0.0125*	0.0191*	0.0206	0.0037	0.0069	-0.0006
	(0.0086)	(0.0115)	(0.0205)	(0.0066)	(0.0104)	(0.0155)	(0.0063)	(0.0081)	(0.0120)
N	1,601	1,136	1,136	1,601	1,136	1,136	1,601	1,136	1,136
R-squared	0.8547	0.8933	0.9278	0.9040	0.9239	0.9471	0.9400	0.9558	0.9716
Mean of Dependent Variable	0.372	0.392	0.392	0.401	0.420	0.420	0.421	0.438	0.438
University Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
University Tier-Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
CZ-Year Fixed Effects	N	Y	Y	N	Y	Y	N	Y	Y
University Trends	N	N	Y	N	N	Y	N	N	Y

	Income in Top Quintile, Conditional on Parents in Quintile					
	4	4	4	5	5	5
Cumulative New Offices Opening within 10 Miles	0.0005	0.0055*	0.0050	-0.0013	0.0009	-0.0029
	(0.0019)	(0.0032)	(0.0061)	(0.0012)	(0.0022)	(0.0047)
Firms Recruiting After Moving within 10 Miles	-0.0019	-0.0012	-0.0052	0.0043*	0.0081	0.0065
	(0.0034)	(0.0061)	(0.0091)	(0.0024)	(0.0050)	(0.0075)
N	1,601	1,136	1,136	1,601	1,136	1,136
R-squared	0.9514	0.9626	0.9745	0.9727	0.9805	0.9886
Mean of Dependent Variable	0.449	0.464	0.464	0.494	0.506	0.506
University Fixed Effects	Y	Y	Y	Y	Y	Y
University Tier-Year Fixed Effects	Y	Y	Y	Y	Y	Y
CZ-Year Fixed Effects	N	Y	Y	N	Y	Y
University Trends	N	N	Y	N	N	Y

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the university level. Dependent variable is the probability students are in the top 20% of the income distribution in 2014 for their birth cohort, conditional on parents' income in the given quintile. This variable is measured at the university x cohort level, and is from the *mobility report cards* (Chetty et al. 2017). The explanatory variables capture recruiting outcomes on their campus when these students were 22 years old. Observations are weighted by the count in the university x cohort cell. See text for details.

Appendix Table A12: Changes in University Characteristics Around Office Openings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Share Scoring > 700 on SAT Math or 30 on ACT Math	Percent Admitted	SAT Verbal, 75th Percentile	ACT English, 75th Percentile	Number of Students	Out of State Tuition	Percent Black	Percent Hispanic	Regional Rank
Post Move, Short Run	0.002*	0.019**	0.929***	0.024	-49.954*	345.042***	-0.000	0.000	-0.708*
	(0.001)	(0.008)	(0.346)	(0.048)	(25.533)	(66.435)	(0.000)	(0.000)	(0.373)
Post Move, Long Run	0.005**	0.029**	0.919	0.101*	-42.986	847.401***	0.000	0.000	-0.756
	(0.002)	(0.011)	(0.638)	(0.055)	(50.673)	(156.414)	(0.001)	(0.001)	(0.624)
Observations	139,219	147,559	134,285	80,285	202,292	199,839	202,292	202,292	139,219
R-Squared	0.972	0.436	0.962	0.942	0.991	0.964	0.986	0.977	0.969

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the firm level. All regressions include firm/university pair fixed effects and firm/year fixed effects. See Table 2 for definitions of Post Move, Short Run and Post Move, Long Run. Number of observations differs with each dependent variable because these variables are not reported by the universities in some years. The first four columns, and the last column, are estimated using only years greater than or equal to 2004, since this is when these variables become available. Singletons are dropped based on the regression sample in each column. See text for details.

Appendix Table A13: Access to Additional Nearby Firms at 20-22 Years Old, and the Effect on Reaching the Top 1% of Incomes at 30-34 Years Old

	Income in Top 1%, Conditional on Parents in Quintile								
	1	1	1	2	2	2	3	3	3
Cumulative New Offices Opening within 10 Miles	0.0009	0.0011	0.0001	0.0012*	0.0008	0.0012	-0.0005	-0.0004	-0.0016
	(0.0009)	(0.0015)	(0.0014)	(0.0007)	(0.0016)	(0.0014)	(0.0005)	(0.0009)	(0.0013)
Firms Recruiting After Moving within 10 Miles	0.0078**	0.0087**	0.0033	0.0006	0.0008	-0.0044	0.0016	-0.0008	-0.0071*
	(0.0033)	(0.0041)	(0.0036)	(0.0036)	(0.0060)	(0.0041)	(0.0025)	(0.0036)	(0.0041)
N	2,189	1,542	1,542	2,189	1,542	1,542	2,189	1,542	1,542
R-squared	0.8366	0.9026	0.9658	0.8903	0.9246	0.9743	0.9298	0.9468	0.9789
Mean of Dependent Variable	0.0320	0.0342	0.0342	0.0329	0.0363	0.0363	0.0346	0.0380	0.0380
University Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
University Tier-Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
CZ-Year Fixed Effects	N	Y	Y	N	Y	Y	N	Y	Y
University Trends	N	N	Y	N	N	Y	N	N	Y

	Income in Top 1%, Conditional on Parents in Quintile					
	4	4	4	5	5	5
Cumulative New Offices Opening within 10 Miles	0.0007*	-0.0003	-0.0002	0.0008**	0.0007	-0.0008
	(0.0004)	(0.0009)	(0.0009)	(0.0003)	(0.0007)	(0.0006)
Firms Recruiting After Moving within 10 Miles	0.0009	0.0048*	0.0003	0.0020*	0.0017	-0.0020
	(0.0017)	(0.0028)	(0.0028)	(0.0010)	(0.0014)	(0.0016)
N	2,189	1,542	1,542	2,189	1,542	1,542
R-squared	0.9606	0.9712	0.9881	0.9858	0.9913	0.9972
Mean of Dependent Variable	0.0386	0.0421	0.0421	0.0557	0.0599	0.0599
University Fixed Effects	Y	Y	Y	Y	Y	Y
University Tier-Year Fixed Effects	Y	Y	Y	Y	Y	Y
CZ-Year Fixed Effects	N	Y	Y	N	Y	Y
University Trends	N	N	Y	N	N	Y

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the university level. The explanatory variables capture recruiting outcomes on campus in a given year. The dependent variable is the average probability students are in the top 1% of the income distribution at age 30-34 in 2014 for their birth cohort, conditional on parents' income in the given quintile. This is averaged over the cohorts who were 20-22 years old in the year of the recruiting outcome, for the 1980-1984 birth cohorts. These income success rates at the university x cohort level are from the mobility report cards (Chetty et al. 2017). Observations are weighted by the total count in the university x cohort cells, for the 20-22 year olds from the 1980-1984 birth cohorts in the given year. See text for details.

Appendix Table A14: Access to Additional Nearby Firms at 20-22 Years Old, and the Effect on Reaching the Top Income Quintile at 30-34 Years Old

	Income in Top Quintile, Conditional on Parents in Quintile								
	1	1	1	2	2	2	3	3	3
Cumulative New Offices Opening within 10 Miles	0.0014	0.0028	0.0030	-0.0013	0.0006	0.0001	-0.0003	0.0031	0.0001
	(0.0021)	(0.0032)	(0.0039)	(0.0020)	(0.0035)	(0.0032)	(0.0014)	(0.0022)	(0.0020)
Firms Recruiting After Moving within 10 Miles	0.0072	0.0075	-0.0014	0.0129*	0.0225**	0.0174**	0.0025	0.0044	-0.0033
	(0.0060)	(0.0095)	(0.0090)	(0.0066)	(0.0092)	(0.0075)	(0.0056)	(0.0067)	(0.0050)
N	2,189	1,542	1,542	2,189	1,542	1,542	2,189	1,542	1,542
R-squared	0.9286	0.9474	0.9815	0.9530	0.9628	0.9852	0.9705	0.9784	0.9932
Mean of Dependent Variable	0.372	0.393	0.393	0.402	0.421	0.421	0.422	0.439	0.439
University Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
University Tier-Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
CZ-Year Fixed Effects	N	Y	Y	N	Y	Y	N	Y	Y
University Trends	N	N	Y	N	N	Y	N	N	Y

	Income in Top Quintile, Conditional on Parents in Quintile					
	4	4	4	5	5	5
Cumulative New Offices Opening within 10 Miles	0.0008	0.0037*	0.0009	-0.0005	0.0018	-0.0005
	(0.0013)	(0.0019)	(0.0022)	(0.0009)	(0.0016)	(0.0012)
Firms Recruiting After Moving within 10 Miles	-0.0024	-0.0012	-0.0048	0.0024	0.0015	-0.0035
	(0.0038)	(0.0050)	(0.0053)	(0.0021)	(0.0038)	(0.0047)
N	2,189	1,542	1,542	2,189	1,542	1,542
R-squared	0.9747	0.9820	0.9933	0.9843	0.9892	0.9971
Mean of Dependent Variable	0.449	0.465	0.465	0.495	0.506	0.506
University Fixed Effects	Y	Y	Y	Y	Y	Y
University Tier-Year Fixed Effects	Y	Y	Y	Y	Y	Y
CZ-Year Fixed Effects	N	Y	Y	N	Y	Y
University Trends	N	N	Y	N	N	Y

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the university level. The explanatory variables capture recruiting outcomes on campus in a given year. The dependent variable is the average probability students are in the top 20% of the income distribution at age 30-34 in 2014 for their birth cohort, conditional on parents' income in the given quintile. This is averaged over the cohorts who were 20-22 years old in the year of the recruiting outcome, for the 1980-1984 birth cohorts. These income success rates at the university x cohort level are from the mobility report cards (Chetty et al. 2017). Observations are weighted by the total count in the university x cohort cells, for the 20-22 year olds from the 1980-1984 birth cohorts in the given year. See text for details.