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Is there a startup wage premium? Evidence from MIT graduates

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ABSTRACT

While startups are the center of extensive policy discussion given their outsized role in job creation, it is not clear whether they create high quality jobs relative to incumbent firms. This paper investigates the wage differential between venture capital-backed startups and established firms, given that the two firm types compete for talent. Using data on MIT graduates, I find that non-founder employees at VC-backed startups earn roughly 10% higher wages than their counterparts at established firms. To account for unobserved heterogeneity across workers, I exploit the fact that many MIT graduates receive multiple job offers. I find that wage differentials are statistically insignificant from zero when individual fixed effects are included. This implies that much of the startup wage premium in the cross-section can be attributed to selection, and that VC-backed startups pay competitive wages for talent. To unpack the selection mechanism, I show that individual preferences for risk as well as challenging work strongly predict entry into VC-backed startups.

1. Introduction

Politicians and pundits routinely tout that startups are the engine of job creation in the US economy. True to popular belief, young businesses account for roughly 70% of gross job creation in the US (Haltiwanger et al., 2012). While startup companies play a vital role in creating jobs, it is not clear whether startups — relative to established firms — create high quality jobs. In light of the fact that startups employ a disproportionately high share of young workers (Ouimet and Zarutskie, 2014), a central question remains: do startups or large established firms create better paying jobs for young workers?

Although prior studies extensively document that large established firms generally pay higher wages than their smaller (Brown and Medoff, 1989; Oi and Idson, 1999) and younger counterparts (Davis and Haltiwanger, 1991; Brown and Medoff, 2003; Haltiwanger et al., 2012), the existing set of evidence is difficult to interpret for two reasons. First, the potential sorting of workers across employers limits the interpretation of cross-sectional wage comparisons. For instance, if large firms possess superior managerial talent as shown in the (Lucas, 1978) span of control theory, then high-ability workers may sort into large firms and thus command higher wages. Exploiting the fact that many graduates from Massachusetts Institute of Technology (MIT) receive multiple job offers, this study seeks to uncover the counterfactual wages that the first set of non-founder employees at startups ("early employees") would have earned if these young workers had instead joined large established companies.

Second, prior studies do not clearly distinguish high-growth startups from small businesses. While many policymakers broadly use the term entrepreneurship to refer to all new enterprises, small businesses and high-growth startups are fundamentally different types of firms (Schoar, 2010). High-growth startups are a small subset of new firms that grow rapidly and account for a disproportionately high share of wealth and job creation (Shane, 2009; Decker et al., 2014). In contrast, most small businesses (e.g. local restaurants) tend to remain small because they typically do not intend to grow large or innovate in a meaningful way (Hurst and Pugsley, 2011). Given their distinct growth intentions, high-growth startups — unlike small businesses — compete against incumbent firms for talent. Therefore, a suitable setting to compare wages between startups and established firms is one in which workers who join startups are much more likely to do so in the high-growth rather than the small business sector.

MIT is a particularly appropriate setting to study the allocation of top technical talent between high-growth startups and established corporations. While MIT selectively draws highly talented individuals that may not represent the average worker, the right tail of the talent distribution is precisely where the rich interplay between high-growth startups and established firms can be studied. This is because entrepreneurial growth is itself an extremely skewed outcome; a very small fraction of startups at the right tail of the quality distribution are responsible for much of the job creation and impactful innovation (Guzman and Stern, 2016). To quantify the skewness, Puri and Zarutskie (2012) estimate that only 0.10% of the US firms born between 1981 and 2005 ever receive venture capital financing. Given that a large portion of MIT graduates are prolific inventors, entrepreneurs,

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and early employees of high-growth ventures, MIT graduates are much more likely to select into both established firms and high-growth startups — rather than small businesses — where their skills are directly used.

This paper explores the wage differential between venture capital-financed startups and large established firms, and the role of selection as the channel through which these differences persist. Using data on graduating college students from MIT, I find that VC-backed startups on average pay 8% to 13% higher wages than their more established counterparts holding all observable individual-level covariates constant. Given that VC-backed firms are — by construction — young and small, this finding stands in contrast to the literature's well-documented wage premium associated with large and old firms. However, the observed startup wage premium for MIT graduates is consistent with the recent evidence that the relationship between firm age and wages becomes negative when controlling for employee age (Ouimet and Zarutskie, 2014) or focusing on rapidly growing startups (Sorenson et al., 2016). Nonetheless, relatively high wages associated with VC-backed startups are robust across several regression specifications. Given that venture capital investors typically concentrate their deals in a few select industries, I restrict the sample to the high-tech sector and find that the startup wage premium remains statistically significant albeit slightly attenuated in magnitude.

Next, I test for selection as the source of wage differentials between startups and established firms. Even with a rich set of control variables, cross-sectional wage comparisons can be biased due to selection based on unobservable characteristics such as ability. The two groups of workers appear to be systematically different along several observable dimensions, suggesting that there may also be unobserved differences that lead to non-random sorting of workers. For instance, early employees receive more job offers and less strongly prefer job security and firm reputation relative to workers at established firms. To account for unobserved heterogeneity across workers, I focus on MIT graduates who receive multiple job offers from both firm types. Originally employed by Stern (2004), this identification strategy allows for within-person comparison of wages.

Based on empirical specifications that use individual fixed effects, I find that the effect of startup employment on wages becomes negative and statistically indistinguishable from zero. At a minimum, these results reject the large, positive wage premium associated with entrepreneurial employment in the cross-section. More broadly, these findings suggest a positive selection of high-ability workers into startups; counterfactually, they would also command relatively high wages at established firms. Overall, much of the startup wage premium can be attributed to selection. This result highlights the substantial role that endogenous sorting of heterogeneous workers plays in determining key labor market outcomes such as wages. In addition, though they face more credit constraints than large firms, VC-backed startups appear to pay competitive wages for talent.

Empirical exploration of the dynamics of high-growth startups vis-à-vis established firms is important to both policymakers and researchers for several reasons. First, in terms of startup entry, the allocation of productive workers has significant implications for economic growth (Baumol, 1990; Murphy et al., 1991; Philippon, 2010). Given the recent surge in venture capital activity, hiring at venture capital-backed firms has risen.[1] As a result, talented young workers have increasingly joined early-stage companies financed by venture capital. For instance, the share of MIT graduates joining VC-backed startups rapidly grew from less than 2% to 14% between 2006 and 2014. In tandem with this rise, the portion joining the financial sector sharply fell from 30% to 5% in the same period. If workers' career paths are endogenous to the set of sector-specific skills and social ties developed during initial employment (Gompers et al., 2005; Elfenbein et al., 2010; Campbell, 2013), then this phenomenon has larger implications for the future supply of innovators and entrepreneurs.

Second, from a policy perspective, it is important to understand whether startups create high-paying jobs relative to those in other sectors of the economy. There are numerous policy efforts aimed to encourage entrepreneurship typically through tax breaks and funding (e.g. SBA loans). Burgeoning evidence shows that tax breaks and financing aid are effective levers in enhancing entrepreneurial activity (Gentry and Hubbard, 2000; Howell, 2017). However, Shane (2009) argues that simply encouraging more entrepreneurship is a flawed policy approach because the vast majority of new firms generate little economic impact. For instance, it is not clear whether the new jobs stemming from policy-induced entrepreneurial entries are low quality jobs. Since wages are a key indicator of job quality, wage determination between startups and established firms is an insightful empirical analysis.

Third, scholars in the fields of labor economics and entrepreneurship have not sufficiently unpacked the importance and the role of early employees. While founders are undoubtedly important, high-skilled employees play a critical role in the growth and success of nascent firms. Attracting and retaining high quality workers is a challenge for early-stage companies because they compete against established firms for talent. Yet, very little is known regarding the first set of non-founder employees that join startup companies (Stuart and Sorenson, 2005; Roach and Sauermann, 2015). Therefore, the lack of empirical and theoretical attention on early employees leaves the human capital piece of entrepreneurship under-explored. This study offers one of the first set of empirical evidence on the characteristics of high-skilled young workers who join VC-backed startups and the wages that they earn relative to their counterfactual wages at established companies.

The remainder of this paper is structured as follows: Section II reviews the relevant prior literature and the conceptual framework. Section III explains the identification strategy exploiting multiple job offers and the empirical setting. Section IV presents the empirical results on the startup wage differential, tests for selection effects, and investigates the mechanisms that determine workers' entry decision between VC-backed startups and established firms. Section V concludes with this study's main insights, limitations, and implications for future research.

2. Literature review and conceptual framework

2.1. Existing evidence

In theory, should startup salaries be meaningfully different from those at large established companies? If so, what is the equilibrium wage that a startup must pay in order to induce a worker into the young company who would otherwise sort into an established firm? As a useful starting point, the literature on the returns to entrepreneurship may offer relevant insights because in a sense, early employees are an extension of the founding team. Unfortunately, the financial returns to entrepreneurship appear to be a puzzle. While many studies show that entrepreneurs earn less than their salaried counterparts (Borjas and Bronars, 1989; Evans and Leighton, 1989; Hamilton, 2000; Hall and Woodward, 2010), more recent studies argue that the pecuniary returns to entrepreneurship are relatively high (Levine and Rubinstein, 2017; Kartashova, 2014; Sarada, 2014; Manso, 2016).

Results are seemingly inconsistent largely due to the broad definition of entrepreneurship. While many scholars and policy-makers generalize all small or young firms as startups, entrepreneurial firms are extremely heterogeneous in their growth outcomes (Decker et al., 2014). Broadly, there are two types of entrepreneurship that fundamentally differ in their economic intentions, skill composition, and rates of job creation (Schoar, 2010). On the one hand, small businesses

[1] Venture Capital Activity at 13-Year High" Ernst & Young Global Limited. 5 February 2015 < http://www.ey.com/GL/en/Newsroom/News-releases/News-EY-venture-capital-activity-at-13-yearhigh > .