Start-Up Firms and Corporate Culture:

Evidence from Advertised Corporate Culture

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Abstract

I document the advertised corporate culture among start-up firms from an online job board. Two corporate culture types emerge: one that concerns the well-being of employees (worker-centered culture) and another that emphasizes other values, such as customers, firms, and markets (firm-centered culture). The worker-centered culture attracts 20% more applications than the other culture type. Firms advertising the worker-centered culture pay 5% lower salaries than measurably similar jobs. Outcomes do not significantly differ among firms that promote different types of corporate culture. To assess whether a worker-centered culture is adopted to reduce labor costs or enhance productivity, I develop an equilibrium model. The model implies that many firms adopt a worker-centered culture primarily for cost savings.

Keywords: Corporate culture, Wage differentials, Entrepreneurship

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1 Introduction

Understanding large and persistent differences in measured productivity across firms has been a central issue in economics. Previous studies have focused on measurable firm factors such as incentive pay (e.g., Lazear (2000)), human-resource practices (e.g., Prennushi et al. (1997); Hamilton et al. (2003)), and managerial practices/managers (e.g., Bertrand and Schoar (2003); Bloom and Van Reenen (2007); Bender et al. (2018); Bandiera et al. (2020)). By contrast, the role of intangible firm characteristics is relatively less investigated despite its importance (Syverson (2011); Crouzet et al. (2022)).

Corporate culture is often considered an important intangible asset by successful business owners and managers. Indeed, recent studies document that several measures of corporate culture are significantly associated with firm performance (e.g., Guiso et al. (2015); Graham et al. (2017); Li et al. (2019)).[1] Yet, relatively little is known about the mechanisms through which corporate culture generates a real impact.

In this paper, I show that corporate culture can serve as an important nonwage component for workers in start-up firms. Using unique data from an online job board targeting high-tech start-up companies, I find that popular corporate culture exists among workers, and firms advertising the popular corporate culture exploit worker preferences by paying significantly lower wages. On the other hand, outcomes do not significantly differ among firms that promote different types of corporate culture. By developing an equilibrium model, I show that many firms adopt the popular culture primarily for cost savings, rather than productivity gains.

A unique feature of this online job board is its corporate culture section. The job board asks each company to describe its corporate culture, which is displayed in a separate section below the

[1] Corporate culture in this paper refers to the notion of corporate culture *defined by a firm* in the job posting. Theoretical studies suggest various definitions of corporate culture. I discuss the relationship between the advertised corporate culture and theoretical definitions of corporate culture in Section 3.2.

job description, allowing applicants to easily view and compare them. This feature enables me to systematically analyze the corporate culture that start-up companies advocate on a large scale (about 1,350 companies). The data also contain detailed information about each job posting, the job postings to which each applicant applied, and the applicants whom each job-posting firm invites for an interview.

I first document and characterize the advertised corporate culture. Reading start-up firms' descriptions of their culture reveals that many firms advertise their culture as something that could be attractive to young workers. For example, the most frequently used adjective for describing a company's culture is "fun." To further characterize each firm's corporate culture, I exploit the following idea: if two firms have similar cultures, the usage of words describing their cultures would be similar. To implement this idea, I conduct a cluster analysis. I find evidence of two main corporate cultures identified through three text clusters. Two clusters describe the well-being of employees (worker-centered culture), and the remaining cluster emphasizes other values, such as customers, products, or markets (firm-centered culture).

With this characterization, I document new empirical findings. First, a job posted by a firm advertising a worker-centered culture attracts significantly more applications than a similar job without a worker-centered culture. For example, controlling for detailed fixed effects, a job posted by a firm advertising a worker-centered culture attracts three more applications (the average number of applications per job is 15). This finding holds under various robustness checks, suggesting that some applicants prefer a worker-centered culture. Second, jobs posted by firms that advertise a worker-centered culture offer significantly lower salaries than measurably similar jobs. For example, I show that the monthly salary of jobs posted by firms advertising a worker-centered culture is about 5% lower than that of otherwise similar job postings. This finding remains robust under an alternative specification that compares jobs for which the same applicant received interview invi-

tations. This suggests that some firms may leverage a worker-centered culture as a non-monetary benefit to compensate for lower wage offers. On the other hand, firm outcomes do not significantly differ between firms that promote a worker-centered culture and those that do not.

To rationalize the empirical findings, I develop an equilibrium model that explains why some workers opt for a worker-centered culture and why some firms provide such a culture. There is a unit measure of entrepreneurs with linear utility in consumption. To start a business, entrepreneurs need to hire a worker. Entrepreneurs can attract workers by providing wages and corporate culture. In particular, entrepreneurs can provide two types of corporate culture: worker-centered and firm-centered. Depending on the type of corporate culture, a firm's productivity may change. Entrepreneurs are characterized by their productivity in a firm-centered culture (baseline productivity) and their relative productivity gains from adopting a worker-centered culture compared to a firm-centered culture. There are two types of baseline productivity: a low type and a high type. The model also includes a unit measure of workers with identical productivity, each supplying one unit of labor to maximize utility. In addition to consumption, workers gain utility depending on the type of corporate culture they work in. Workers are characterized by their relative utility gains from a worker-centered culture compared to a firm-centered culture.

An equilibrium is defined by the relative wage between two types of culture and the number of firms offering a worker-centered culture such that (1) workers maximize their utility given the relative wage, (2) entrepreneurs maximize their profits given the relative wage, and (3) the number of workers willing to work in a worker-centered culture matches the number of firms offering such a culture. In equilibrium, firms that experience greater productivity gains from a worker-centered culture are matched with workers who highly value such a culture, while firms with smaller productivity gains are matched with workers who value it less.

When combined with two key empirical findings—(1) lower wages in firms promoting a worker-

centered culture compared to firms with a firm-centered culture, and (2) no significant differences in outcomes between the two types of firms—the model yields several implications. First, some entrepreneurs, regardless of their baseline productivity, adopt a worker-centered culture primarily to reduce labor costs, even at the expense of revenue. Given that the observed wage in firms with a worker-centered culture is significantly lower than in those with a firm-centered culture, entrepreneurs choose to adopt a worker-centered culture as long as the resulting wage savings outweigh the associated productivity loss, even when they face such losses.

Second, productivity gains for low-type entrepreneurs who choose a worker-centered culture are limited, indicating that reducing labor costs is likely their primary motivation. This result is based on the empirical finding that profits among firms adopting a worker-centered culture are not significantly different from those adopting a firm-centered culture. Intuitively, if the productivity gains from adopting a worker-centered culture were sufficiently large to allow low-type entrepreneurs to overcome their baseline productivity disadvantage relative to high-types, then the equilibrium profits of worker-centered firms would exceed those of firm-centered firms, contrary to the empirical evidence.

Finally, low-type entrepreneurs are more likely than high-type entrepreneurs to adopt a worker-centered culture. Consistent with the second point, if high-type entrepreneurs were more likely to realize productivity gains from adopting a worker-centered culture, the proportion of high-type entrepreneurs would be higher among firms that adopt a worker-centered culture than among those that adopt a firm-centered culture. Consequently, the average profits of worker-centered firms would exceed those of firm-centered firms, contradicting the observed data. Supporting this prediction, I find that firms exhibiting higher productivity—specifically, those that secured venture funding prior to their job postings and those that subsequently experienced growth—are less likely to advertise a worker-centered culture.

Overall, the results suggest that the majority of workers experience utility gains in a worker-centered corporate culture, whereas only a small fraction of entrepreneurs achieve productivity gains by adopting such a culture. To clear the labor market, the wage for a worker-centered culture, relative to the wage for a firm-centered culture, is reduced. This prompts many firms to choose the worker-centered culture to reduce labor costs, even with potential productivity losses.

This paper contributes to the literature on wage structures within start-up firms. Start-ups play a significant role in job creation, contributing substantially to national economies (Haltiwanger et al. (2013)). Recognizing their economic significance, there has been a growing focus on understanding the labor market dynamics of young firms. Previous studies show that employees at start-ups earn lower wages on average than their counterparts in established companies (e.g., Brown and Medoff (2003); Sorenson et al. (2021)). This discrepancy is partly attributed to entrepreneurs' credit constraints (Herkenhoff et al. (2021)), which limit competitive wages and lead to a strategy of back-loading compensation (Howell and Brown (2023)). Additionally, evidence suggests that individuals with lower productivity are more likely to be matched with start-ups (Babina et al. (2018, 2019); Schmieder (2023)). This paper provides a novel explanation for why wages in start-ups are low, proposing that many individuals working in start-ups appreciate an employee-friendly corporate culture and are willing to accept lower wages in exchange for such a culture.

This paper contributes to the literature emphasizing the importance of corporate culture in value creation.[2] A seminal study in this field, the Stanford Project on Emerging Companies (SPEC), conducted interviews in the mid-1990s with founders, CEOs, and HR directors from nearly 200 technology start-ups in Silicon Valley, identifying several organizational models (Baron and Hannan (2002)).[3] SPEC demonstrates that high-tech start-ups in the mid-1990s Silicon Valley prioritized

[2]Early theoretical studies characterize corporate culture and investigate possible mechanisms through which it can affect real outcomes (e.g., Kreps (1990); Crémer (1993); Hermalin (2001); Rob and Zemsky (2002); Van den Steen (2010); Kosfeld and Von Siemens (2011)).

[3]For further details about SPEC, refer to Appendix E.

labor-related challenges and adopted diverse strategies to address them. My study suggests that these insights remain highly relevant beyond the specific context of 1990s Silicon Valley. Additionally, my research extends SPEC's findings by showing how corporate culture plays a critical role in shaping worker selection.

Also related, Edmans (2011) finds that companies recognized as "100 Best Companies to Work For in America" achieve higher long-run stock returns than their industry peers. Guiso et al. (2015) discover that while firms' stated values do not predict performance, employees' perceptions of managerial integrity positively correlate with firm success. Graham et al. (2017) document North American executives' belief in the importance of corporate culture. Grennan (2020) shows that consistent cultural communication by U.S. banks correlates with better operational and stock performance. Gorton and Zentefis (2020) conceptualize corporate culture as shared weights that a group places on cultural elements, exploring its influence on firm boundaries.[4] My research contributes to this line of literature in several important ways. First, I demonstrate that advertised corporate culture in the labor market can create value through employee selection, especially for firms looking to reduce labor costs. Second, while most previous studies focus on already established firms and do not provide insights into how a firm's initial corporate culture is formed, the results in this paper suggest that worker-side factors—such as the preferences of early employees—rather than just firm-side factors like entrepreneurs' visions or other firm-specific considerations, can influence a firm's initial corporate culture.

This paper is also related to the literature on compensating wage differentials. Since the seminal work by Rosen (1974), several nonwage components of a job have been studied to understand wage differences across jobs.[5] Using rich information from an online job board, I show that another

[4]Other studies suggest that corporate culture plays a role in influencing CEO turnover (e.g., Fiordelisi and Ricci (2014)) and operational efficiency (e.g., Li et al. (2019)). For a comprehensive review of the recent literature on corporate culture, see Gorton et al. (2022).

[5]These job characteristics include occupational safety (e.g., Viscusi and Aldy (2003); León and Miguel (2017); Lavetti (2018); Guardado and Ziebarth (2019)), flexible work arrangements (e.g., Bloom et al. (2015); Mas and Pallais

important nonwage aspect of a job is corporate culture. I further show that some firms advocate a particular type of corporate culture to compensate for a low wage. To my knowledge, this paper is the first to estimate the compensating wage differential for corporate culture among workers in start-up companies.[6]

The paper is organized as follows. Section 2 describes the data and the online job market. Section 3 characterizes the posting firms' advertised corporate culture. The main empirical findings are documented in Sections 4 and 5. Section 6 presents the model and its implications, and Section 7 concludes.

2 Data

This paper uses data from an online job board based in Singapore. The website was established in 2016 and has targeted tech industries in Singapore and nearby Southeast Asian countries. In this section, I provide an overview of the target market and the background of this online job board.

The recent increase in internet access among Southeast Asians has created many business opportunities for tech start-up firms in the region. Between 2015 and 2019, the aggregate sales value of the Southeast Asian tech industry grew at a 33% annual rate, reaching an annual value of 100 billion USD in 2019. More than 3,000 tech start-ups were created between 2016 and 2019.[7]

The company that created the online job board aims to provide a job platform for start-up firms in Southeast Asia's tech industries, particularly in Singapore. The service was launched in May 2016, and I use data from May 2016 to October 2018 for this study.

(2017)), health benefits (e.g., Gruber (1994); Dey and Flinn (2005); Eriksson and Kristensen (2014)), and job security (e.g., Abowd and Ashenfelter (1981); Bonhomme and Jolivet (2009). The idea of compensating wage differentials has also been applied to understand lawyers' and scientists' career choices (e.g., Weisbrod (1983); Goddeeris (1988); Stern (2004)), medical residency (e.g., Marder and Hough (1983)), and union wage premiums (e.g., Duncan and Stafford (1980); Antos (1983)).

[6]This paper also relates to the growing literature on online job markets (e.g., Kuhn and Shen (2012); Deming and Kahn (2018); Hershbein and Kahn (2018); Banfi and Villena-Roldan (2019); Marinescu and Wolthoff (2020)).

[7]The summary statistics for Southeast Asian tech industries are primarily sourced from the *e-Conomy SEA 2019* report published by Google, Temasek, and Bain & Company.

A unique feature of this online job board is its corporate culture section. Job-posting firms are asked to describe their corporate culture in addition to the job details. A company's description of its culture is then displayed in a separate section below the job description, allowing applicants to easily view and compare corporate cultures across posting firms.[8] Note that the description of corporate culture is firm-specific and remains identical across all job postings within a given firm. Thanks to this unique feature, I can observe start-up firms' descriptions of their culture on a large scale.[9]

Job postings from other countries are sometimes written in their native language, which makes consistently applying text analyses, shown below, challenging. Applicants looking for a part-time or freelance job can be substantially different from those looking for a full-time job. Therefore, I focus on firms that ever posted full-time jobs located in Singapore.

To provide a broad picture of the market, I present the summary statistics of posting firms in Table 1. Panel A of Table 1 shows the size distribution of posting firms. Most firms have fewer than 50 employees. For a subset of firms, the founding year is available, and Panel B of Table 1 presents its distribution. Most firms began operations between 2014 and 2016, suggesting that many young firms use the job board. Panel C of Table 1 shows the industry composition of firms. About 95% of firms (1,680 out of 1,764) report their industry.[10] Fintech firms constitute more than 10% of posting firms, followed by Professional Service and Software firms. Almost all posting firms can be categorized as tech-related firms, the online job board's intended target. The data also contain information about venture funding. Of the 1,764 posting firms, 5.73% had received venture funding prior to 2018. Overall, a typical posting firm is a small- to medium-sized, tech-related firm with a high probability of receiving venture funding.

[8] From a discussion with company personnel, I learned that the company considers corporate culture one of the most crucial aspects of a job. For this reason, the company decided to allocate a large space on each posting page to showcase each firm's corporate culture.

[9] More details about the online job market are provided in Appendix A.

[10] When firms register on the website, they are asked to select an industry category provided by the website.

Table 2 presents the summary statistics for applicants' characteristics. Among applicants with available educational information, 97% have at least graduated from college. Most applicants are young; half graduated less than three years before applying. More than 60% of applicants resided outside Singapore when they applied for a job in Singapore.

3 Characterizing Advertised Corporate Culture

In this section, I document and analyze the advertised corporate culture. Before conducting a formal analysis, I manually review the advertised corporate culture. Although corporate culture descriptions vary across firms, many describe their culture in a way that appeals to young workers. For example, one of the most frequently used adjectives to describe a company's culture is "fun," along with "passionate," "open," and "driven."

To further analyze each firm's description of corporate culture, I conduct text analyses. One approach could be to impose predefined corporate culture types and map each text to one of these predefined categories (e.g., Fiordelisi and Ricci (2014); Li et al. (2019)). However, most previous studies on corporate culture focus on large firms. It is unclear whether the corporate culture observed on the current online job board, which primarily features young firms, can be characterized by the types defined in previous studies. For this reason, rather than imposing predefined corporate culture types, I let the data reveal differences in corporate culture across firms.

3.1 Cluster Analysis

I first conduct a cluster analysis. The basic idea behind cluster analysis is intuitive and well-suited for this study: if two firms have a similar culture, the words they use to describe it will also be similar. Moreover, the procedure for cluster analysis is straightforward and transparent.

Specifically, I conduct a partitioning cluster analysis known as the K-means algorithm. For a

predetermined number of clusters, K, the algorithm randomly assigns K initial group centers among the observations.[11] Each observation is assigned to the group with the closest center based on a distance measure.[12] The mean of the observations assigned to each group becomes the new group center. This process is repeated until all observations remain in the same group as in the previous iteration. As a result, the cluster analysis partitions the observations into K non-overlapping groups.

No consensus exists on the optimal number of clusters. As the number of clusters increases, a goodness-of-fit measure (e.g., the within-cluster sum of squares) improves, but the distinction between clusters becomes less clear. Following Bandiera et al. (2020), I determine the minimum number of clusters needed to observe a meaningful distinction. After experimenting with several values of K, I chose $K = 3$ as the benchmark number of clusters. When $K = 3$, one cluster emerges as distinct from the others (the first cluster below), while the distinction between the remaining two clusters is less clear. This pattern persists even as I increase the number of clusters: one cluster remains distinctive, while the remaining clusters appear similar.[13]

In Appendix C, I present examples of corporate cultures in each cluster. Out of 1,764 firms, 78% (1,363 firms) report their culture, while 22% do not. About 19% of firms are categorized into the first cluster. The most frequently used keywords in this cluster include technology, product, and market. Firms in the first cluster often emphasize the value of their market, product, or customers but not necessarily their employees.

The second and third clusters are similar in that firms categorized into these two clusters emphasize employee-oriented values. For example, firms in the second cluster tend to describe their culture as innovative, open, fast-paced, or energetic. Firms in the third cluster describe their

[11] I tried several (random) initial group centers. The results are similar across different initial random assignments.

[12] I use the Pearson distance measure, with the detailed procedure provided in Appendix B.

[13] As a robustness check, I generate clusters with $K = 4$ and $K = 5$ and conduct regression analyses. The results change only slightly, both qualitatively and quantitatively.

culture as a fun working environment with learning opportunities. Many firms claim to provide a worker-centered culture; the proportion of firms in the second and third clusters is 30% and 29%, respectively.

3.2 Discussion

From the cluster analysis, two corporate culture types emerge: one that emphasizes employees and another that emphasizes other values, such as customers, products, or markets. The cluster analysis assumes that corporate culture can be categorized into a set of mutually exclusive types. To check whether this particular assumption drives the result, I conduct a latent Dirichlet allocation (LDA) analysis in Appendix D. This method allows for the possibility that advertised culture reflects a mixture of core values—groups of related words that describe coherent underlying norms. Despite using different assumptions and estimation methods, the LDA analysis generates similar results. These findings indicate that the characterization of advertised corporate culture in this paper is not driven by specific assumptions or estimation methodologies for text analysis; rather, it reflects the variation in how posting firms describe their corporate culture.

The theoretical literature provides various definitions of corporate culture. For example, corporate culture is defined as a firm's shared stock of knowledge, language, and customs that reduce information-transmission costs within the organization (Crémer (1993)). It is also defined as shared beliefs about the best technology, strategy, or course of action for a firm to adopt (Van den Steen (2010)), or as the tendency of firm members to cooperate (Rob and Zemsky (2002); Kosfeld and Von Siemens (2011)).[14]

The advertised corporate culture that I document in Sections 3.1 appears to reasonably reflect the definition of corporate culture proposed by Kreps (1990). Kreps (1990) defines corporate culture

[14]For a survey of corporate culture in economic theory, see Hermalin (2001, 2012); Gorton et al. (2022).

as principles (or norms and values) applied to adapt to unforeseen contingencies in transactions between hierarchical superiors and hierarchical inferiors (in this case, a firm and its employees). Because unforeseen contingencies arise (by definition) after a formal contract is established between a firm and its employees, firms have an incentive to preserve or promote the reputation of their corporate culture to attract potential employees. Corporate culture provides potential employees with an ex-ante understanding of how the organization will respond to circumstances as they arise.[15] When a firm prioritizes making the world's best product, potential employees will expect actions to be taken—when unforeseen circumstances arise—in a way that improves the firm's product. Likewise, when a firm emphasizes a vibrant and fun working environment that prioritizes employees' well-being, potential employees will expect actions to favor employees.[16]

4 Corporate Culture and Labor Market

In this section, I document the role of advertised corporate culture in the labor market.

4.1 Summary Statistics for Job Postings

Before conducting regression analyses, I first present summary statistics for job postings.

I clean the job titles in a manner similar to Marinescu and Wolthoff (2020). First, I convert job titles to lowercase and remove company names, job locations, punctuation, and special characters. Then, I retain only the first four words. Since most firms are IT-related, the majority of job postings are for IT technicians or marketing personnel.

Table 3 presents the characteristics of these postings. Note that most applicants have recently

[15] Kreps (1990) formalizes this idea using a game-theoretic framework involving a long-lived firm (or entrepreneur) and short-lived employees. In this framework, corporate culture serves as a selection criterion for determining which equilibrium is chosen among many.

[16] The characterization of corporate culture in this paper also relates to elements from existing classification frameworks discussed in Baron and Hannan (2002); Chatman et al. (2014). For a more detailed comparison, see Appendix E.

graduated from college. Given that most job postings target these young applicants, the minimum requirement for previous experience is low (the median is 1 year).

Of the 9,458 job postings, approximately 80% include a monthly salary range. Given that most jobs target young, inexperienced workers, the average salary is relatively low. The mean and median are similar, suggesting a relatively symmetric distribution. Unlike a typical online job board, many postings on this website offer equity.[17] A quarter of job postings indicate that the firm offers equity compensation.

Note that the website provides a collection of keywords describing benefits and allows posting firms to select those applicable to them. The chosen keywords appear in the second part of the culture section. Given that most firms do not select any keywords, I construct two dummy variables to summarize benefits: lifestyle benefits and welfare benefits. The keywords for lifestyle benefits include casual dress code, company outings, flexible working hours, free food, pet-friendly office, recreational area, and the ability to work from home. The keywords for welfare benefits include dental/health insurance, gym membership, employee discounts, vacation time, wellness programs, childcare assistance, bonuses, paid maternity/paternity leave, paid sick leave, and transportation reimbursement. The lifestyle (welfare) dummy equals 1 if a job posting includes a lifestyle (welfare) benefit keyword in the culture section.

Panel C of Table 3 shows the percentage of firms providing each type of benefit. Only about 10% of firms offer at least one lifestyle benefit, and a similar share of firms provide at least one welfare benefit. Among firms using this online job board, offering welfare benefits is uncommon; 86% do not provide any benefits. Given that most posting firms are tech-related start-ups, which often lack funding, they may be less likely to commit to providing welfare benefits.[18]

[17]The online job board provides posting firms the option to show whether they provide equity compensation. If a firm selects "yes" for this option, the website displays that the job includes equity compensation, but no further details (e.g., the amount of equity) are provided.

[18]Liu et al. (2023) provides evidence that U.S. firms offer higher-quality maternity leave benefits to attract female talent in labor markets where female talent is relatively scarce. The key distinction between this paper and Liu et al.

Panel D of Table 3 presents application and acceptance information for each posting.[19] On average, a job posting attracts 15 applicants, but the distribution is highly skewed. For example, a substantial number of postings receive zero applications. A unique feature of these data is the ability to observe which applicants are invited for an interview. Therefore, for each job posting with at least one application, I define the acceptance rate as the number of invited applicants divided by the total number of applicants. The last row of Panel D provides summary statistics for the acceptance rate. The average acceptance rate is 0.05, indicating that about 5% of applicants are invited for an interview.

Panel E of Table 3 shows the proportion of job postings by firms advertising each type of corporate culture. Cluster 1 is a dummy variable that equals 1 if a job posting is from a firm whose culture description falls into the first cluster defined in Section 3.1. Clusters 2 and 3 are defined similarly. The proportion of job postings categorized under Cluster 1 is 0.21, while the proportions for Clusters 2 and 3 are 0.28 and 0.33, respectively, which are comparable to the overall distribution of firms across these clusters.

4.2 Does Advertised Corporate Culture Matter?

I begin by examining whether workers exhibit heterogeneous preferences over corporate culture. To this end, I analyze application data, taking advantage of the fact that the platform imposes no restrictions on applications and that the marginal cost of applying is negligible. This setting allows application behavior to reflect applicants' preferences. Specifically, I test whether job postings associated with different corporate culture types attract significantly different numbers of applicants.

For each job posting, I define the number of applicants as the dependent variable and regress

(2023) lies in the legal context: in the U.S., paid maternity leave is not legally required, allowing firms to use it as an incentive to attract highly skilled female employees. In Singapore, however, paid maternity leave is mandated by law, limiting firms' ability to differentiate themselves by offering this benefit.

[19] Throughout the paper, an applicant is considered accepted if they are invited for an interview.

it on other posting characteristics, including corporate culture information. In doing so, I compare job postings within the same year-month, with the same job title, in the same industry, and with the same vacancy count.

In the first column of Table 4, I include a dummy variable indicating whether a job posting provides corporate culture information, along with other controls. First, the pecuniary components of a job play a crucial role in attracting applicants. An increase of 1,000 SGD in the maximum monthly salary attracts 0.6 more applications.[20] Providing equity attracts approximately five additional applications. Applicants are also more likely to apply to larger firms and those offering lifestyle benefits. Finally, after controlling for other characteristics, job postings that include corporate culture information attract 2.25 more applications.

Displaying corporate culture information affects the amount of information available to applicants. In the second column of Table 4, I additionally control for the word count of a job posting to account for the total amount of information provided. Even after controlling for word count, the culture dummy remains significant with nearly the same magnitude as in the first column of Table 4, suggesting that the content of information (specifically about corporate culture), rather than the quantity, drives a higher number of applications.

In the third column of Table 4, I include 10 dummy variables indicating whether a job posting contains each of the 10 most frequently used adjectives describing corporate culture. Of these adjectives, "open," "fun," and "fast-paced" are associated with significantly more applications compared to postings without corporate culture information. For example, a job posting by a firm that describes its corporate culture as "fun" attracts about two additional applications. After controlling for these 10 dummy variables, the coefficient for the culture dummy becomes insignificant, suggesting that firms using "open," "fun," and "fast-paced" to describe their corporate culture attract

[20]Note that the coefficient for salary is relatively low, given that salary information is presented as a range.

significantly more applications.

In the fourth column of Table 4, I replace the 10 dummy variables for individual adjectives with dummy variables for the three corporate culture clusters. Compared to job postings without corporate culture information, the two clusters associated with worker-centered culture attract significantly more applications. Both clusters attract approximately three additional applicants, representing a 20% increase relative to the average number of applications. By contrast, firms that advertise a firm-centered culture do not attract more applications than those that do not advertise their corporate culture.[21]

To summarize, corporate culture—particularly one that prioritizes employees—matters: firms that advertise an employee-focused culture attract significantly more applications than measurably similar job postings. Given that Clusters 2 and 3 are qualitatively similar (Section 3.1) and yield similar regression coefficients (Section 4.2), I define "worker-centered culture" as Clusters 2 and 3, and "firm-centered culture" as Cluster 1 hereafter.

4.3 Corporate Culture and Posted Wage

In this section, I examine the relationship between advertised corporate culture and posted wages. To do so, I regress the log of monthly salary on a dummy variable indicating a worker-centered culture, where monthly salary is calculated as the average of the minimum and maximum salary: (Monthly salary min. + Monthly salary max.)/2.

The key challenge for identification is that unobserved differences across job postings may systematically correlate with both the tendency to advertise corporate culture and the wage. For example, job postings aimed at attracting high-quality candidates often offer a more attractive "total compensation package," which could lead to both higher wages and a greater likelihood of

[21] I replace the dummy variables for the three culture clusters with the core values from the LDA analysis for each observation and estimate the equation. The results are consistent with the regression analysis using cluster dummies: a corporate culture that exhibits stronger worker-centered core values attracts significantly more applicants.

advertising a worker-centered culture.

I address this challenge in two ways. First, I exploit the richness of the data by controlling for detailed information about each job posting. Specifically, I include dummy variables for equity provision, lifestyle benefits, and welfare benefits (as defined in Section 4.1) to account for other job characteristics. Additionally, I control for job title and year-month fixed effects. This approach allows me to compare job postings that are otherwise very similar—posted in the same month—but differ in corporate culture type.[22]

As a second approach, I adopt the identification strategy proposed by Stern (2004), who estimate the relationship between wages and discretion in scientific research. To control for heterogeneity across jobs, Stern (2004) compare multiple job offers received by individual scientists, thereby examining positions with similar total compensation specific to each candidate.

There are two notable differences between his study and this paper. First, while Stern (2004) observe final job offers, this study can observe information only up to the job interview stage. Second, whereas Stern (2004) analyze data from 63 Ph.D. biologists, this study examines a much larger sample of job candidates across a wide range of job titles.

To mitigate the lack of job offer information, I confine the comparison of job postings so that they are more comparable in terms of total compensation. First, I compare job postings for which each candidate received an interview invitation in the same year. Restricting the time window ensures that the characteristics of the jobs leading to interview invitations are more comparable. Second, I exclude job applicants whose number of interview invitations falls above the top 5th percentile. Some workers are particularly sought after, and firms may want to interview them even if they generally target lower-tier candidates. For these highly sought-after candidates, the

[22]Search frictions on the online job board may contribute to wage variation (e.g., Hwang et al. (1998); Bonhomme and Jolivet (2009)). If two jobs with the same title are posted in the same month, candidates are more likely to encounter and consider both postings. Therefore, this first approach helps mitigate the impact of search frictions among these listings.

differences across jobs for which they receive interview invitations could be larger.

The estimation results are presented in Table 5. The first column shows the results from the first approach, where the unit of observation is a job posting. Among firms posting the same job title in the same month, those advertising a worker-centered culture pay approximately 5% lower monthly salaries than other firms.

The second and third columns of Table 5 present results from the second identification approach, where the unit of observation is a job application that leads to an interview invitation. The second column controls for job-title fixed effects, while the third column additionally controls for other job characteristics, including dummy variables for equity, lifestyle, and welfare benefits. The results are comparable to those in the first column, suggesting that firms advertising a worker-centered culture pay lower monthly salaries than other firms.

Overall, both approaches lead to the same conclusion: firms that advertise a worker-centered culture pay significantly lower salaries than those that do not. This finding is consistent with the concept of compensating wage differentials (Rosen (1974)); recognizing that some workers value a worker-centered culture, firms offer lower salaries when providing such an environment.

5 Corporate Culture and Firm Outcomes

The previous section establishes the significance of advertised corporate culture in the labor market. In this section, I examine whether the advertised corporate culture is associated with long-run firm outcomes.

To document firm outcomes, I use updated profiles of posting firms from 2023. First, I manually verify the current activity of these firms' URLs.[23] In addition to checking firms' URLs, I conduct further searches to determine whether firms have changed their web addresses. Arora

[23]Utilizing web information to assess firm outcomes is a common approach in the literature (e.g., Lerner and Malmendier (2013)).

and Nandkumar (2011) highlight that mergers and acquisitions on favorable terms are significant outcomes for high-tech firms. To identify whether a firm has been merged or acquired, I search for relevant news articles using its name via Google. I classify a firm as failed if its URL is inactive (without changing to another) and it has not been acquired or merged. Firms that do not meet these criteria are considered surviving. I create a dummy variable, "survive," which equals 1 for surviving firms. Similarly, I define a dummy variable, "M&A," which equals 1 for firms that have undergone a merger or acquisition.

To assess the intensive margin of firm outcomes among surviving firms, I use the latest firm data collected in June 2023. By comparing firm sizes in 2018 and 2023, I evaluate whether firms that posted jobs have grown over this five-year period. I define a dummy variable, "Growth," which equals 1 for surviving firms that have increased in size. Additionally, I introduce "Funding," a variable representing the number of venture funding rounds a surviving firm secured after 2018.[24]

To examine the relationship between outcome variables and advertised corporate culture, I conduct regression analyses. Panel A of Table 6 presents the results for extensive margin outcomes. The initial regression excludes additional control variables, while subsequent regressions incorporate firm characteristics from 2018 (number of employees and a venture funding dummy) and industry fixed effects. The analysis of the survive variable shows that, across all regressions, firms promoting a worker-centered culture exhibit a slightly lower survival probability. However, this difference is minor relative to the 76% average survival rate and lacks statistical significance (columns (1)-(3)). Similarly, the regression results for the M&A variable indicate that firms promoting a worker-centered culture are slightly less likely to undergo mergers or acquisitions, though this difference is also not statistically significant (columns (4)-(6)).

Panel B of Table 6 presents the results for intensive margin outcomes. I first examine the rela-

[24]The summary statistics for long-run firm outcomes are presented in Appendix G.

tionship between corporate culture and firm growth among surviving firms using various regression specifications (columns (1)-(3)). Firms promoting a worker-centered culture exhibit a 1–2% lower probability of growth, though this difference is not statistically significant. Similarly, regression analyses of the number of funding rounds reveal no significant differences between firms emphasizing a worker-centered culture and those emphasizing a firm-centered culture (columns (4)-(6)).

To summarize, I find no significant association between corporate culture and firm survival or acquisition. Similarly, analyses of surviving firms reveal no significant link between corporate culture and either growth or venture funding. Overall, firm outcomes do not significantly differ between those promoting a worker-centered culture and those that do not.

6 Theoretical Framework

Section 4.2 shows that firms advertising a worker-centered culture attract significantly more applications than measurably similar postings, suggesting the presence of applicants who value a worker-friendly environment. Section 4.3 shows that firms that advertise a worker-centered culture tend to offer lower pay, indicating that, knowing workers' preferences, firms reduce wages when providing a worker-friendly workplace. Together, these findings align with the literature that views corporate culture as a non-monetary attribute that offsets lower pay.

On the other hand, another line of literature emphasizes that corporate culture can affect firm productivity. Depending on the productivity gains (or losses) associated with different cultures, firms choose their culture optimally—potentially explaining the noisy relationship between culture and firm outcomes observed in Section 5.

In this section, I present a model that captures firms' incentives to adopt a worker-centered culture—whether to increase productivity, reduce wages, or both. Which channel dominates on average depends on two key components: one reflecting workers' preferences for a worker-centered

culture, and the other capturing firms' productivity gains (or losses) from adopting it.

6.1 Environment

Workers' problem

There is a unit measure of workers, each supplying one unit of labor to maximize utility. A worker's utility is given by the function:

$$u(c, g) = c + \nu \cdot g, \quad g \in \{0, 1\}.$$

Here, c denotes consumption, and g represents the corporate culture provided by the employer. There are two types of corporate culture: worker-centered ($g = 1$), which favors employees, and firm-centered ($g = 0$), which does not. Wages (w_g) may vary by corporate culture.

The first key component of the model is ν. Building on the insights of Akerlof and Kranton (2005) on identity, I assume that utility varies depending on the corporate culture in which workers are employed. Akerlof and Kranton (2005) emphasize that workers' identity and attachment to their firm are key factors influencing their behavior within the organization. The parameter ν represents the utility gain (or loss) from working in a worker-centered corporate culture relative to a firm-centered culture. Each worker is characterized by a heterogeneous ν, which follows the cumulative distribution function (CDF) $F(\nu)$.

Entrepreneurs' problem

There is a unit measure of entrepreneurs with linear utility in consumption. Entrepreneurs can choose between two corporate culture types: worker-centered ($g = 1$) and firm-centered ($g = 0$). Each entrepreneur must select a culture type to hire a fixed number of workers, which is normalized to one. Empirical findings suggest that firms share homogeneous preferences for potential employ-

ees (Appendix F.2) and that workers sort into different corporate cultures exhibit similar ability levels (Appendix F.3). To incorporate these findings in a simple manner, I assume that workers' productivity is homogeneous, so firm productivity does not vary based on whom they hire. Firm profit (π_g) depends on the chosen corporate culture:

$$\begin{aligned} \pi_0 &= \theta - w_0 \qquad \text{if } g = 0, \\ \pi_1 &= \theta + \epsilon - w_1 \quad \text{if } g = 1, \end{aligned} \tag{1}$$

where θ represents a firm's productivity under a firm-centered culture.

The second key component of the model is ϵ. The parameter ϵ captures the productivity difference between a worker-centered and a firm-centered culture. For instance, fostering a sense of identity between workers and their firm in a worker-centered culture may boost morale or build motivational capital, potentially enhancing productivity (Akerlof and Kranton (2005)). However, this may come with trade-offs. Entrepreneurs maintaining an employee-friendly work environment may struggle to demand peak performance or may need to prioritize employee interests over their own, potentially reducing productivity from the firm owner's perspective. On the other hand, both Lazear (1995) and Hermalin (2001) highlight that entrepreneurs can shape corporate culture, thereby influencing firm productivity. ϵ can be interpreted as a treatment effect, representing the change in firm productivity due to adopting a worker-centered culture relative to a firm-centered culture.

I denote θ as baseline productivity and classify entrepreneurs into two types: low type (θ_L) and high type ($\theta_H > \theta_L$). The proportion of low-type entrepreneurs is p, while that of high-type entrepreneurs is $1 - p$. The distribution of ϵ depends on θ, where ϵ_L corresponds to firms with θ_L and ϵ_H to firms with θ_H. Each entrepreneur is characterized by the pair (θ, ϵ), where the CDFs of

ϵ are denoted as $G_L(\epsilon)$ for ϵ_L and $G_H(\epsilon)$ for ϵ_H. Both CDFs are assumed to be continuous over the real line.

Equilibrium

An equilibrium is defined as the relative wage ($\Delta w = w_0 - w_1$) and the number of firms offering a worker-centered culture such that: (1) workers maximize their utility given the relative wage, (2) entrepreneurs maximize their profits given the relative wage, and (3) the number of workers willing to work in a worker-centered culture equals the number of firms providing such a culture.

Note that since the measures of workers and entrepreneurs are identical, clearing the market for a worker-centered culture also implies clearing the market for a firm-centered culture.

6.2 Characterization

I begin by characterizing workers' optimal decisions. Given ν, a worker chooses a worker-centered culture if and only if:

$$\nu \geq \Delta w. \tag{2}$$

Otherwise, the worker selects a firm-centered culture. Note that all workers, regardless of their utility gain from a worker-centered culture (ν), face the same equilibrium wage differential (Δw). Suppose the wage differential is positive, as observed in the data. Workers whose utility gain exceeds the wage penalty will choose a worker-centered culture, while those whose gain does not will choose a firm-centered culture. Consequently, the labor supply to a worker-centered culture, given the relative wage, is $1 - F(\Delta w)$.

Entrepreneurs' optimal choices are characterized by equation (1). From equation (1), an en-

trepreneur provides a worker-centered corporate culture if and only if equation (3) holds:

$$\Delta w \geq -\epsilon. \tag{3}$$

Otherwise, the entrepreneur adopts a firm-centered culture. Note that all entrepreneurs, regardless of their productivity gain from a worker-centered culture (ϵ), face the same equilibrium wage differential (Δw). Therefore, when the wage differential is positive, *any* entrepreneur can reduce wage costs by adopting a worker-centered culture. In this case, only those whose productivity loss exceeds the wage savings will choose a firm-centered culture, while entrepreneurs whose loss is smaller than the equilibrium wage differential—or who experience productivity gains—will choose a worker-centered culture.

To ensure that all entrepreneurs operate at equilibrium, I assume $w_0 \leq \theta_L$, which guarantees a non-negative profit for the baseline technology (firm-centered culture) from equation (1). Additionally, I assume that w_0 is set exogenously, reflecting the reality that start-up companies compete within the broader labor market.

Recall that I allow the productivity gain or loss from adopting a worker-centered culture to vary across entrepreneur types. Therefore, the labor demand for a worker-centered culture, given Δw, is $p\big[1 - G_L(-\Delta w)\big] + (1-p)\big[1 - G_H(-\Delta w)\big]$.

Finally, the equilibrium wage differential is determined by

$$1 - F(\Delta w) = p\Big[1 - G_L(-\Delta w)\Big] + (1-p)\Big[1 - G_H(-\Delta w)\Big]. \tag{4}$$

The left-hand side of equation (4) is a decreasing function of Δw, starting from 1 as Δw approaches minus infinity and converging to 0 as Δw approaches infinity. Conversely, the right-hand side is an increasing function of Δw, starting from 0 as Δw approaches minus infinity and reaching 1 as Δw

approaches infinity. Therefore, there exists a unique relative wage Δw^* satisfying equation (4).

Let $\hat{\epsilon} = -\Delta w^*$ and $\hat{\nu} = \Delta w^*$, where $\Delta w^* = w_0^* - w_1^*$ represents the equilibrium wage differential. In equilibrium, entrepreneurs with superior technology for providing a worker-centered culture (i.e., $\epsilon \geq \hat{\epsilon}$) hire workers who value a worker-centered culture more (i.e., $\nu \geq \hat{\nu}$). Conversely, entrepreneurs with inferior technology for providing a worker-centered culture (i.e., $\epsilon < \hat{\epsilon}$) hire workers who value it less (i.e., $\nu < \hat{\nu}$).

6.3 Model Implications

Recall two key findings documented in Sections 4 and 5: (1) lower wages in firms promoting a worker-centered culture compared to those with a firm-centered culture, and (2) no significant differences in outcomes between the two types of firms. Based on the characterization in section 6.2, I derive the necessary conditions for these two findings to be satisfied in the model.

To prove the proposition, I introduce the following notation:

$$a = \frac{pG_L(\hat{\epsilon})}{pG_L(\hat{\epsilon}) + (1-p)G_H(\hat{\epsilon})}, \qquad b = \frac{p(1-G_L(\hat{\epsilon}))}{p(1-G_L(\hat{\epsilon})) + (1-p)(1-G_H(\hat{\epsilon}))},$$

$$\pi_0^L = \theta_L - w_0^*, \qquad \pi_0^H = \theta_H - w_0^*,$$

$$\pi_1^L = \theta_L + \epsilon_L - w_1^*, \qquad \pi_1^H = \theta_H + \epsilon_H - w_1^*.$$

Here, a represents the proportion of low-type entrepreneurs among firms adopting a firm-centered culture, while b represents the proportion of low-type entrepreneurs among firms adopting a worker-centered culture.

The average profits of firms choosing a firm-centered culture, E_0, and those choosing a worker-

centered culture, E_1, are given by:

$$E_0 = a\pi_0^L + (1-a)\pi_0^H \quad \text{and} \quad E_1 = b\,\mathbb{E}[\pi_1^L \mid \epsilon_L > \hat{\epsilon}] + (1-b)\,\mathbb{E}[\pi_1^H \mid \epsilon_H > \hat{\epsilon}].$$

Lemma 1. *If a positive wage differential exists in equilibrium ($\Delta w^* > 0$), some entrepreneurs must choose a worker-centered culture even if it results in productivity losses.*

Proof. All proofs are provided in the Appendix. □

As elaborated above, regardless of their productivity gain or loss from a worker-centered culture, entrepreneurs can reduce wage costs by adopting such a culture when the equilibrium wage differential is positive. Therefore, as long as the savings from lower wages outweigh the productivity loss, entrepreneurs with productivity losses will choose to adopt a worker-centered culture.

Given the positive wage differential observed in the data, Lemma 1 suggests that some entrepreneurs of both types adopt a worker-centered culture solely to reduce labor costs, even at the expense of revenue.

Lemma 2. *If $E_0 = E_1$ and $\Delta w^* > 0$, the average productivity gains under a worker-centered culture for low-type entrepreneurs, conditional on adopting a worker-centered culture, $\mathbb{E}[\epsilon_L \mid \epsilon_L > \hat{\epsilon}]$, are lower than the baseline productivity gap between low- and high-type entrepreneurs, $\theta_H - \theta_L$.*

Conditional on each type, the profit of entrepreneurs who choose a worker-centered culture is always greater than that of those who do not. This is because entrepreneurs always retain the option of not adopting a worker-centered culture and earning the baseline profit $\theta_i - w_0^*$, for $i \in \{L, H\}$. In other words, the profit from a firm-centered culture serves as a lower bound for each type.

Although profits are always higher *within* each type for those choosing a worker-centered culture, this may not hold *across* types. For example, when comparing a high-type entrepreneur who chooses

a firm-centered culture with a low-type entrepreneur who chooses a worker-centered culture, it is not obvious who earns more. The former benefits from higher baseline productivity, while the latter gains additional profit from adopting a worker-centered culture.

However, if the expected productivity gain from adopting a worker-centered culture for low-type entrepreneurs, $\mathbb{E}[\epsilon_L \mid \epsilon_L > \hat{\epsilon}]$, exceeds the baseline productivity gap, $\theta_H - \theta_L$, then the average revenue of low-type entrepreneurs who choose a worker-centered culture exceeds that of high-type entrepreneurs who choose a firm-centered culture. Given that wage costs are lower for those adopting a worker-centered culture, the average profit of these low-type entrepreneurs will also be higher. As a result, the average profit of firms choosing a worker-centered culture would be strictly higher than that of firms choosing a firm-centered culture—contrary to what we observe in the data.

Since the data show that the average profits of firms adopting a worker-centered culture equal those of firms adopting a firm-centered culture, Lemma 2 indicates that productivity gains for low-type entrepreneurs who choose a worker-centered culture are limited.

Proposition 1. *If $E_0 = E_1$, the probability that a low-type entrepreneur chooses a worker-centered culture, $1 - G_L(\hat{\epsilon})$, is greater than the probability that a high-type entrepreneur chooses a worker-centered culture, $1 - G_H(\hat{\epsilon})$.*

If the share of entrepreneurs choosing a worker-centered culture is identical across types, then the distribution of types will be the same across culture groups. Since worker-centered firms yield higher profits conditional on type, this implies higher average profits among those adopting a worker-centered culture—contradicting the empirical finding of no profit difference. The same contradiction arises if a larger share of high-type entrepreneurs adopt the worker-centered culture, as this would further increase average profits among those adopting a worker-centered culture.

Given that the average profits of firms adopting a worker-centered culture equal those of firms

adopting a firm-centered culture, Proposition 1 implies that, in equilibrium, low-type entrepreneurs are more likely than high-type entrepreneurs to adopt a worker-centered culture.

Summary

Overall, the model, together with the data, implies that low-type entrepreneurs are more likely to adopt a worker-centered culture—even when productivity gains are limited or potential revenue losses exist—as a strategy to reduce labor costs.

Based on these results, we can further consider what would happen if more workers began to value a worker-centered culture. As preferences shift, demand for such a culture increases at the existing wage differential. In response, the equilibrium wage differential adjusts: the market wage for worker-centered firms declines further. This lower wage makes adopting a worker-centered culture more attractive to entrepreneurs, incentivizing more of them to do so.

In the current equilibrium, the marginal entrepreneur—who is indifferent between adopting a worker-centered or firm-centered culture—incurs a productivity loss from adopting a worker-centered culture. Thus, entrepreneurs who newly adopt it in response to increased worker demand will also experience productivity losses, but these are more than offset by the further decline in wages.

As another thought experiment, we can consider what would happen if all firms were required to adopt a worker-centered culture at the current equilibrium wage. Note that, conditional on each entrepreneur type, the minimum productivity gain from a worker-centered culture among those who voluntarily chose a worker-centered culture is greater than the maximum productivity gain among those who chose a firm-centered culture. Therefore, if all entrepreneurs were forced to adopt a worker-centered culture—including those who would not have chosen it voluntarily—average firm profit would decline. The extent of this decline, however, depends on model assumptions—such as

the distribution of ϵ.

6.4 Testing Model Implications

In this section, I test the model's key implication using two sources of variation: initial venture funding status and changes in advertised corporate culture.

Venture Funding Status

A testable implication of the model is that high-type entrepreneurs are less likely to adopt a worker-centered culture. To evaluate this prediction, I examine the relationship between the likelihood of advertising a worker-centered culture and a firm's venture funding status before 2018. Specifically, I regress the worker-centered culture dummy on venture funding status and firm size in 2018, including industry fixed effects.

The results are presented in Table 7. First, smaller firms are more likely to advertise a worker-centered culture, though the relationship between firm size and culture type is not significant. Second, firms that secured venture funding before their job postings are less likely to promote a worker-centered culture. For example, the probability of advertising a worker-centered culture is about 20% lower for venture-capital-backed firms than for those without venture funding. The negative association between prior venture funding and the adoption of a worker-centered culture remains statistically significant even after controlling for industry fixed effects.

Venture capital typically invests in high-productivity firms (e.g., Sørensen (2007); Chemmanur et al. (2011)). Consequently, the strong negative association between venture funding and the adoption of a worker-centered culture suggests that higher-productivity firms are less likely to advertise a worker-centered culture, aligning with the model's predictions.

Changes in Corporate Culture

If growth reflects an increase in baseline productivity, another testable implication is that among firms that initially advertised a worker-centered culture, those that experienced growth are more likely to change their culture than those that did not.

To test this implication, I first examine how firms modified their advertised corporate culture between 2018 and 2023 using updated firm profiles collected in June 2023. Among the 1,363 firms in the main dataset that posted their culture on the online job board in 2018, 158 made changes to their culture descriptions during this period. In most cases, these modifications were minimal, often consisting of refinements or minor wording adjustments.

To systematically analyze the evolution of firms' advertised cultures, I augment the original dataset with updated culture descriptions from the 158 firms that modified their postings and an additional 19 firms that did not post their culture in 2018 but did so in 2023, treating them as distinct entities. I then perform the same cluster analysis outlined in Section 3.1 using this augmented sample. After categorizing each firm as either worker-centered or firm-centered, I assess how many of the 158 firms changed their culture type.

Table 8 presents the results. Among the 158 firms, only 18 modified their culture descriptions in a way distinguishable by the cluster analysis. Specifically, approximately 1% of firms initially classified as worker-centered and about 2% of those classified as firm-centered changed their culture type. Among the 19 firms that first posted their corporate culture after 2018, 13 are classified as worker-centered, while 6 are categorized as firm-centered.

Table 9 presents the regression results for culture change. The dependent variable, "Culture Change," is a dummy variable equal to 1 if a firm's culture type changed between 2018 and 2023. "Growth" is a dummy variable equal to 1 if a firm survived and experienced an increase in size, measured by the number of employees, during the same period. Firms that experienced growth are

more likely to change their initial culture than non-growing firms, with this tendency being more pronounced among those that initially advertised a worker-centered culture.

While a firm's initial culture description tends to persist, growing firms—especially those that initially advertised a worker-centered culture—are more likely to change it, consistent with the model's prediction.

6.5 Discussion

Overall, the results indicate that while most workers benefit from a worker-centered corporate culture, only a small proportion of entrepreneurs achieve productivity gains by adopting it. To clear the labor market, wages for a worker-centered culture decrease relative to those for a firm-centered culture. This wage adjustment incentivizes many firms—particularly those with low baseline productivity—to adopt a worker-centered culture to reduce labor costs, even if it results in limited or negative productivity gains.

More broadly, these findings suggest that firms actively respond to workers' demands when shaping their initial corporate culture to reduce labor costs. I also show that initial corporate culture choices often remain unchanged for many years, particularly among non-growing firms. Consequently, worker-side factors—such as the preferences of early employees, rather than solely firm-side factors like entrepreneurs' visions or other firm-specific considerations—can play a significant role in shaping corporate culture in early-stage start-ups.

7 Conclusion

I document start-up firms' corporate culture using online job-posting data. Text analyses reveal two types of corporate culture: one that emphasizes the well-being of employees (worker-centered culture) and one that emphasizes other values, such as customers, products, or markets (firm-

centered culture). Worker-centered culture attracts more applicants and pays lower salaries than the other culture type. Average firm outcomes do not differ across firms that advertise different types of corporate culture. Using an equilibrium model, I show that many firms—especially those with low productivity—adopt a worker-centered culture to reduce labor costs.

Although this paper employs a relatively coarse measure to distinguish worker-centered cultures from firm-centered ones, it is important to acknowledge that organizational culture encompasses a wide array of values and dimensions. The binary measure used here captures broad differences but inevitably sacrifices some granularity. Nonetheless, this approach embeds elements from existing classification frameworks (e.g., Baron and Hannan (2002); Chatman et al. (2014)) and demonstrates how information from online job markets can be effectively leveraged to classify and analyze corporate culture.

Proofs

Proof of Lemma 1. An immediate implication of equation (3) is that $\hat{\epsilon}$ must be less than zero when a positive wage differential is observed in equilibrium ($\Delta w^* > 0$). Consequently, entrepreneurs with ϵ in the range $[\hat{\epsilon}, 0)$ experience productivity losses yet still choose a worker-centered culture. Since both G_L and G_H are continuous over the real line, the terms $G_L(0) - G_L(\hat{\epsilon})$ and $G_H(0) - G_H(\hat{\epsilon})$ are both positive. □

Proof of Lemma 2. Observe that $E_0 = E_1$ if and only if

$$(a-b)(\pi_0^L - \pi_0^H) = b\left(\mathbb{E}[\pi_1^L \mid \epsilon_L > \hat{\epsilon}] - \pi_0^L\right) + (1-b)\left(\mathbb{E}[\pi_1^H \mid \epsilon_H > \hat{\epsilon}] - \pi_0^H\right).$$

Rearranging the above equation gives

$$a(\pi_0^L - \pi_0^H) = b\left(\mathbb{E}[\pi_1^L \mid \epsilon_L > \hat{\epsilon}] - \pi_0^H\right) + (1-b)\left(\mathbb{E}[\pi_1^H \mid \epsilon_H > \hat{\epsilon}] - \pi_0^H\right). \tag{5}$$

Now, I show that $\mathbb{E}[\pi_1^H \mid \epsilon_H > \hat{\epsilon}] > \pi_0^H$. This follows from

$$\begin{aligned}
\mathbb{E}[\pi_1^H \mid \epsilon_H > \hat{\epsilon}] &= \theta_H - w_1^* + \mathbb{E}[\epsilon_H \mid \epsilon_H > \hat{\epsilon}] \\
&= \theta_H - w_0^* + \Delta w^* + \mathbb{E}[\epsilon_H \mid \epsilon_H > \hat{\epsilon}] \\
&= \pi_0^H - \hat{\epsilon} + \mathbb{E}[\epsilon_H \mid \epsilon_H > \hat{\epsilon}] \\
&> \pi_0^H,
\end{aligned} \tag{6}$$

where the last inequality follows from the conditional expectation property $\mathbb{E}[\epsilon_H \mid \epsilon_H > \hat{\epsilon}] > \hat{\epsilon}$.

Since $\pi_0^L - \pi_0^H = \theta_L - \theta_H < 0$, the left-hand side of equation (5) is negative. Given that $\mathbb{E}[\pi_1^H \mid \epsilon_H > \hat{\epsilon}] - \pi_0^H$ is positive by equation (6), if $\mathbb{E}[\pi_1^L \mid \epsilon_L > \hat{\epsilon}] \geq \pi_0^H$, then equation (5) cannot be satisfied. Consequently, $\mathbb{E}[\pi_1^L \mid \epsilon_L > \hat{\epsilon}]$ must be strictly less than π_0^H. Rearranging this condition gives

$$\begin{aligned}
&\pi_0^H > \mathbb{E}[\pi_1^L \mid \epsilon_L > \hat{\epsilon}], \\
\iff &\pi_0^H > \theta_L - w_0^* + \Delta w^* + \mathbb{E}[\epsilon_L \mid \epsilon_L > \hat{\epsilon}], \\
\iff &\pi_0^H > \pi_0^L - \hat{\epsilon} + \mathbb{E}[\epsilon_L \mid \epsilon_L > \hat{\epsilon}], \\
\iff &\theta_H - \theta_L + \hat{\epsilon} > \mathbb{E}[\epsilon_L \mid \epsilon_L > \hat{\epsilon}].
\end{aligned}$$

Thus, when $\hat{\epsilon}$ is negative, $\mathbb{E}[\epsilon_L \mid \epsilon_L > \hat{\epsilon}]$ is strictly less than $\theta_H - \theta_L$, completing the proof. □

Proof of Proposition 1. I first show that for $E_0 = E_1$ to hold, it must be the case that $b > a$.

Observe that $E_0 = E_1$ if and only if

$$(a-b)(\pi_0^L - \pi_0^H) = b\left(\mathbb{E}[\pi_1^L \mid \epsilon_L > \hat{\epsilon}] - \pi_0^L\right) + (1-b)\left(\mathbb{E}[\pi_1^H \mid \epsilon_H > \hat{\epsilon}] - \pi_0^H\right). \tag{7}$$

By equation (6), we know that $\mathbb{E}[\pi_1^H \mid \epsilon_H > \hat{\epsilon}] > \pi_0^H$. By the same reasoning, we obtain $\mathbb{E}[\pi_1^L \mid \epsilon_L > \hat{\epsilon}] > \pi_0^L$. Thus, the right-hand side of (7) is strictly positive.

Now, consider the left-hand side of (7): $(a-b)(\pi_0^L - \pi_0^H)$. Since $\theta_L < \theta_H$, it follows that $\pi_0^L - \pi_0^H < 0$. Therefore, to satisfy equation (7), b must be greater than a.

Next, I show that the probability of choosing a worker-centered culture among low-type entrepreneurs, $1 - G_L(\hat{\epsilon})$, is greater than the probability of choosing a worker-centered culture among high-type entrepreneurs, $1 - G_H(\hat{\epsilon})$, if and only if $b > a$. Observe that

$$1 - G_L(\hat{\epsilon}) = \frac{\phi b}{\phi b + (1-\phi)a}, \quad \text{and} \quad 1 - G_H(\hat{\epsilon}) = \frac{\phi(1-b)}{\phi(1-b) + (1-\phi)(1-a)},$$

where $\phi = p(1 - G_L(\hat{\epsilon})) + (1-p)(1 - G_H(\hat{\epsilon}))$. Note that ϕ represents the equilibrium share of firms adopting a worker-centered culture.

It is straightforward to show that

$$\frac{\phi b}{\phi b + (1-\phi)a} > \frac{\phi(1-b)}{\phi(1-b) + (1-\phi)(1-a)} \iff b > a.$$

This completes the proof.

□

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Tables and Figures

Table 1: Characteristics of Posting Firms

Panel A			Panel C		
No. of employees	Freq.	Percent	Industry	Freq.	Percent
			fintech	172	10.24
1	101	5.88	professional services	118	7.02
$[2, 10]$	637	37.08	software	113	6.73
$[11, 50]$	632	36.79	ad tech	105	6.25
$[51, 200]$	189	11.00	ecommerce	90	5.36
$[201, 500]$	54	3.14	general internet	88	5.24
$[501, 1000]$	22	1.28	enterprise solution	72	4.29
$[1001, 5000]$	42	2.44	artificial intelligence	62	3.69
≥ 5001	41	2.39	health	60	3.57
Total	1,718	100	education	59	3.51
Panel B			media	59	3.51
Founding year	Freq.	Percent	lifestyle	51	3.04
			hardware	48	2.86
2012	56	8.40	security	48	2.86
2013	78	11.69	Logistics & Transportation	42	2.50
2014	111	16.64	Other industries	493	29.35
2015	104	15.59	Total	1,680	100
2016	124	18.59	Panel D		
Other	194	29.09		Mean	Obs.
Total	667	100	Venture funding	0.057	1,764

NOTE: This table presents summary statistics for firms that have posted at least one full-time job in Singapore. Panel A shows the distribution of employees, Panel B presents founding years, Panel C displays industry composition, and Panel D reports the mean of the "venture funding" dummy, which equals 1 if a firm secured venture funding before 2018.

Table 2: Characteristics of Applicants

	Obs.	Mean	Std.	10%	Median	90%
College	11,574	0.97	0.17	0	1	1
Year after graduation	11,574	4.12	4.68	0	3	10
Singapore resident	15,839	0.37	0.48	0	0	1

NOTE: This table presents summary statistics for applicants' characteristics. "College" is a dummy variable that equals 1 if an applicant graduated from college and 0 otherwise.

Table 3: Summary Statistics for Job Postings

	Obs.	Mean	Std.
Panel A			
Minimum experience	9,458	1.27	1.73
Panel B			
Monetary compensation			
Salary info.	9,458	0.79	0.41
Monthly salary min. (SGD)	7,477	3,405	2,513
Monthly salary max. (SGD)	7,477	5,361	4,422
Equity	9,458	0.25	0.43
Panel C			
Non-monetary compensation			
Lifestyle benefit	9,458	0.10	0.30
Welfare benefit	9,458	0.10	0.30
Panel D			
Number of applicants	9,458	14.83	15.91
Acceptance rate	8,179	0.05	0.13
Panel E			
Culture clusters			
Cluster 1	9,458	0.21	0.41
Cluster 2	9,458	0.28	0.45
Cluster 3	9,458	0.33	0.47

NOTE: This table presents summary statistics for job postings. "Minimum experience" refers to the years of experience required for a job. "Salary info." is a dummy variable that equals 1 if salary information is provided. "Equity" is a dummy variable that equals 1 if the job offers equity compensation. "Lifestyle benefit" is a dummy variable indicating whether the job posting includes any of the following keywords: casual dress code, company outings, flexible working hours, free food, pet-friendly office, recreational area, or work-from-home. "Welfare benefit" is a dummy variable indicating whether the job posting includes any of the following keywords: dental/health insurance, gym membership, employee discount, vacation time, wellness program, childcare assistance, bonuses, paid maternity/paternity leave, paid sick leave, or transportation reimbursement. "Acceptance rate" is defined as the ratio of invited applicants to total applicants. "Cluster 1" is a dummy variable that equals 1 if a job posting is from a firm whose culture description falls into the first cluster defined in Section 3.1. "Clusters 2" and "3" are defined similarly.

Table 4: Advertised Corporate Culture and Number of Applications

Outcome	Number of Applications			
	(1)	(2)	(3)	(4)
Salary info	1.10	1.13	1.22	0.92
	(1.14)	(1.15)	(1.14)	(1.16)
Min. salary/1000	-0.19	-0.19	-0.16	-0.18
	(0.38)	(0.38)	(0.37)	(0.38)
Max. salary/1000	0.60**	0.59**	0.59**	0.60**
	(0.24)	(0.24)	(0.24)	(0.25)
Equity	4.57***	4.55***	4.56***	4.55***
	(0.88)	(0.88)	(0.85)	(0.87)
Venture funding	1.10	1.10	0.86	0.85
	(1.56)	(1.56)	(1.47)	(1.53)
Min. employee/1000	1.40**	1.40**	1.49**	1.30*
	(0.66)	(0.66)	(0.63)	(0.66)
Lifestyle	2.01	2.03	1.04	1.46
	(1.69)	(1.69)	(1.86)	(1.80)
Welfare	-0.94	-0.97	-1.72	-1.60
	(1.94)	(1.94)	(1.95)	(2.03)
No culture	-2.25*	-2.19*	-0.59	
	(1.21)	(1.22)	(1.18)	
Text length/1000		0.13	-0.06	0.08
		(0.33)	(0.33)	(0.33)
Open			2.49**	
			(1.09)	
Fun			2.16*	
			(1.14)	
Fast-paced			4.95**	
			(2.20)	
Cluster 1				0.99
				(1.29)
Cluster 2				3.72**
				(1.71)
Cluster 3				3.05***
				(1.16)
Observations	5,327	5,327	5,327	5,327
R-squared	0.52	0.52	0.52	0.52

NOTE: This table presents regression results for the number of applications per job posting. All regressions include the following fixed effects (FE): (1) year×month, (2) job title, (3) industry of the posting firm, (4) remote work eligibility, and (5) vacancy count for the posted job. In the third column, I control for the 10 most frequently used keywords but report only the three keywords that exhibit a statistically significant effect. Standard errors (in parentheses) are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Wage Differential for Worker-Centered Culture

Outcome	ln(salary)		
	(1)	(2)	(3)
Worker-centered culture	-0.05*	-0.08***	-0.07***
	(0.03)	(0.02)	(0.03)
Other job characteristics	Y		Y
Job-title FE		Y	Y
Individual×Year FE		Y	Y
Interview invitations $< 95th$		Y	Y
Job-title×Year×Month FE	Y		
Observations	2,481	2,208	2,208
R-squared	0.74	0.88	0.88

NOTE: This table presents regression results for the log of monthly salary on worker-centered culture. Salary is calculated as the average of the minimum and maximum monthly salary. Worker-centered culture is a binary variable equal to 1 if the posting firm's corporate culture falls into cluster 2 or 3. Other job characteristics include dummy variables for equity, lifestyle, and welfare benefits (defined in Table 3). The unit of observation in regression (1) is a job posting, whereas in regressions (2) and (3), it is an application to a job posting. A job candidate at the 95th percentile of interview invitations received 12 interview invitations. Standard errors (in parentheses) are clustered at the firm level in the first column and at the applicant level in the second and third columns. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Corporate Culture and Firm Outcome

	Panel A: Extensive Margin					
Outcome	Survive			M&A		
	(1)	(2)	(3)	(4)	(5)	(6)
Worker-centered culture	-0.03	-0.01	-0.02	-0.03	-0.01	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Min. employee/1000		0.06***	0.06***		0.13***	0.13***
		(0.00)	(0.01)		(0.01)	(0.01)
Venture funding		0.12***	0.12***		0.29***	0.26***
		(0.03)	(0.04)		(0.05)	(0.05)
Industry FE			Y			Y
Observations	1,764	1,718	1,674	1,764	1,718	1,674
R-squared	0.00	0.02	0.05	0.00	0.10	0.14
	Panel B: Intensive Margin					
Outcome	Growth			Funding		
	(1)	(2)	(3)	(4)	(5)	(6)
Worker-centered culture	-0.02	-0.02	-0.02	-0.06	-0.02	-0.04
	(0.02)	(0.02)	(0.02)	(0.06)	(0.06)	(0.06)
Min. employee/1000		-0.02***	-0.03***		-0.03	-0.03
		(0.00)	(0.00)		(0.02)	(0.02)
Venture funding		0.07	0.04		0.75***	0.66***
		(0.04)	(0.04)		(0.19)	(0.21)
Industry FE			Y			Y
Observations	1,217	1,217	1,201	1,348	1,312	1,278
R-squared	0.00	0.01	0.04	0.00	0.04	0.08

NOTE: This table presents regression results for firm outcome variables on corporate culture type and other observable firm characteristics from 2018. "Worker-centered culture" is a binary variable equal to 1 if a firm's culture is classified as worker-centered. "Min. employee" represents the minimum number of employees in 2018. "Venture funding" is a binary variable equal to 1 if a firm obtained venture funding before 2018. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Venture Funding and Corporate Culture

Outcome	Worker-centered culture	
	(1)	(2)
Venture funding	-0.20***	-0.21***
	(0.05)	(0.05)
Min. employee/1000	-0.02	-0.02
	(0.02)	(0.02)
Industry FE		Y
Observations	1,718	1,674
R-squared	0.01	0.04

NOTE: This table presents the types of firms that advertise a worker-centered culture. "Worker-centered culture" is a binary variable equal to 1 if the posting firm's corporate culture falls into cluster 2 or 3. "Venture funding" is a binary variable equal to 1 if the posting firm received venture funding before 2018. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Corporate Culture: Transition Matrix

	Year 2023			
	Worker-centered culture	Firm-centered culture	No culture	Total
Year 2018				
Worker-centered culture	1,022	11	0	1,033
	(98.9)	(1.1)	(0)	(100)
Firm-centered culture	7	323	0	330
	(2.1)	(97.9)	(0)	(100)
No culture	13	6	382	401
	(3.2)	(1.5)	(95.3)	(100)

NOTE: This table presents the transition matrix for firms' advertised corporate culture from 2018 to 2023. The number in parentheses indicates the proportion of observations conditional on the 2018 characterization.

Table 9: Growth and Culture Change

Outcome	Culture Change		
	(1)	(2)	(3)
Growth	0.06**	0.07**	0.03
	(0.03)	(0.03)	(0.06)
Surviving & Culture Ad. posted in 2018	Y	Y	Y
Worker-Centered in 2018		Y	
Firm-Centered in 2018			Y
Observations	961	731	230
R-squared	0.02	0.03	0.00

NOTE: This table presents the results of the regression analysis examining the relationship between culture change and firms' characteristics. The dependent variable, "Culture Change," is a dummy variable equal to 1 if a firm's culture type changed between 2018 and 2023. "Growth" is a dummy variable equal to 1 if a firm survived and experienced an increase in size, as measured by the number of employees, during the same period. "Worker-Centered in 2018" is a dummy variable equal to 1 if a firm advertised a worker-centered culture in 2018. "Firm-Centered in 2018" is defined similarly. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1