The Value of Employee Satisfaction in Disastrous Times: Evidence from COVID-19[*]

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Abstract

Employee treatment is an important but challenging element of corporate environmental, social, and governance (ESG) policies. Satisfying employee needs can increase corporate productivity, but is also costly to shareholders. Using unique data for Chinese publicly listed firms, we show that having satisfied employees is valuable to the firm. Specifically, firms with higher employee satisfaction scores withstand COVID-19 better, in terms of stock market performance. Such an effect is more pronounced for firms with more intangible assets and in knowledge-based industries. Moreover, higher employee satisfaction scores predict better operating performance. While not fully revealed in tranquil times, the effect of employee satisfaction is materialized when the firms experience negative shocks, such as COVID-19. Our findings suggest that firms can do well in crisis periods by doing good in normal times.

Keywords: Employee satisfaction, Shareholder value, Intangible assets, COVID-19

JEL classification: G32, G34

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Abstract

Employee treatment is an important but challenging element of corporate environmental, social, and governance (ESG) policies. Satisfying employee needs can increase corporate productivity, but is also costly to shareholders. Using unique data for Chinese publicly listed firms, we show that having satisfied employees is valuable to the firm. Specifically, firms with higher employee satisfaction scores withstand COVID-19 better, in terms of stock market performance. Such an effect is more pronounced for firms with more intangible assets and in knowledge-based industries. Moreover, higher employee satisfaction scores predict better operating performance. While not fully revealed in tranquil times, the effect of employee satisfaction is materialized when the firms experience negative shocks, such as COVID-19. Our findings suggest that firms can do well in crisis periods by doing good in normal times.

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1. Introduction

Is it worthwhile for a firm to treat its employees well on a daily basis? The answer is not obvious, because improving employee treatment is a costly endeavor. In the absence of regulations and government interventions, firms usually underinvest in employee welfare, as labor cost reduces corporate profitability in a way that is similar to that of financing cost. Indeed, there is large-sample evidence showing that businesses are *more* likely to fail when they provide a safer workplace.[1] In fact, some believe that firms with merely acceptable working conditions produce more profits for their shareholders.[2] However, there are also potential benefits associated with better employee treatment, such as talent recruiting, retention, and enhanced productivity. In this paper, we examine stock price performance during the COVID-19 in order to provide a definitive answer to this question. The COVID-19 setting is useful to study, as many firms are at the edge of survival, and the employee-firm relation is experiencing unprecedented challenges as well.

Employers expect reciprocity when they treat their employees well. That is, firms hope that more satisfied employees will work harder to increase firm value – especially when firms are facing severe difficulties. However, if employees feel that they are already contributing to a good social cause, then they may engage more in unethical behavior – including shirking and cheating – at work, due to the so-called "moral licensing" (List and Momeni, 2021). COVID-19 forced many people to work from home, making shirking a real concern. On one hand, employees of firms with hostile working environments are likely used to coordination troubles. They may even obtain a productivity boost when they do not need to go to the office, which helps them avoid counterproductive office politics. On the other hand, firms with good employee morale may become less productive under "social distancing", as bonding and collegiality play an important role in their work. COVID-19 provides a rare opportunity to examine the value of employee satisfaction and generate implications on corporate employment policies.

We use novel data to analyze the reaction of stock prices to the outbreak of COVID-19 to quantify the value of employee satisfaction from a shareholder's point of view. The large and exogenous shock from COVID-19 helps the empirical identification. We first present results

[1] See Pagell et al. (2020), which is based on 386,179 organizations in Oregon, USA from 1989 to 2014. They find that the odds and length of survival are smaller for firms providing a safe workplace.

[2] "Office is not home! We respect values, but we also emphasize results and KPI," said Yajun Wu in September 2020. Wu is the Chairwoman and founder of Longfor, a top publicly listed Chinese real estate developer.

from the first trading day after the lockdown of Wuhan. We supplement our event study with longer-term analysis on stock performance and operating performance. We obtain employee satisfaction data from MioTech, a leading FinTech company based in Hong Kong and Shanghai that specializes in environmental, social, and governance (ESG) information for Chinese firms, covering all publicly listed Chinese companies (and many private companies).[3] MioTech uses natural language processing to crowdsource employee satisfaction data from current and former rank-and-file employees that is compiled by websites and other sources similar to that of Glassdoor. The original data includes 58,125 observations, in which we can read both the employee satisfaction numerical scores and textual comments given by individual employees. The regression sample covers more than 1,300 firms that are publicly listed in mainland China. The sample size for our study is large as ESG data for Chinese firms are limited.[4] Thus, one contribution of our study is the more updated and comprehensive sample for Chinese firms' ESG.

We examine stock price reactions to COVID-19 for all firms listed in the two stock exchanges in mainland China ("A shares" in Shanghai and Shenzhen). We focus on February 3, 2020, the first trading day following the lockdown of Wuhan – the Chinese city where the first infected case was identified and the largest number of infected patients resided.[5] We find that, while Chinese stocks experienced record drops on that day, firms with higher employee satisfaction scores withstood the negative shock better than firms with lower employee satisfaction scores did. The economic magnitude of the result is meaningful: the high-low return difference was 1.3 percentage points, while the Shanghai Composite Index dropped 7.7 percentage points on that day. This result is robust to alternative measures and sample selection.

The employee satisfaction effect remains significant even when we exclude firms located in the city of Wuhan from the sample. This finding highlights the pervasive impact of COVID-19 on the financial market and the profound moderating effect of employee satisfaction. Our

[3] MioTech is financed by, among others, Horizons Ventures, the private investment fund of Li Ka-shing (the richest man in Hong Kong), GIC (the sovereign wealth fund of Singapore), J.P. Morgan Asset Management, and HSBC Asset Management's Financial Technology Venture Capital Fund. See media reports:
https://www.scmp.com/tech/enterprises/article/2115417/li-ka-shing-shows-strong-backing-hong-kongs-fintech-sector-leading
https://www.fintechfutures.com/2020/01/hong-kongs-sustainable-finance-start-up-miotech-closes-series-a-funding/

[4] For example, Chen et al. (2017) use a sub-sample of listed firms in mainland China to investigate the effect of mandatory CSR disclosure. The average of treatment firms is around 200 per year. Yin and Zhang (2012) conduct exploratory case studies for 16 firms in the textile and pharmaceutical industries located in Zhejiang province to understand CSR in China.

[5] Figure 1 shows the timeline for the outbreak of COVID-19 in China.

finding suggests that the effect of the observed rank-and-file employee satisfaction on stock returns is not limited to directly infected areas. Instead, healthy people who continue to work for their employers drive the stock price reaction to the pandemic shock.

We extend the event window to 5, 10, 20, and 60 trading days (around three calendar months) after the initial reaction on February 3, and find that the outperformance of high employee satisfaction stocks remains significant during those extended periods. We proceed to examine whether the employee satisfaction effect is temporary or persistent during the sample period. We sort stocks based on the previous year's employee satisfaction scores into high- and low-satisfaction portfolios. Controlling for the Fama-French five factors, we find significant and positive excess returns of the high portfolios. The results are robust to alternative weighting schemes and benchmarks.[6] This finding suggests that employee satisfaction goes beyond a temporary effect, and has a long-term effect on stock market performance.

The stock price reaction suggests that firms which have regularly treated their employees well can weather negative economic shocks better. High morale is important for working-from-home arrangements or no pay leaves, which are meant to ease the financial burden on firms. In contrast, firms that have treated their workers poorly in the past may not have the necessary support from their workers during this disastrous time. It is worth noting that, even though corporate culture is known before COVID-19, its value is not revealed until difficult times, when people pay more attention to such nuisances and when individuals are personally experiencing the negative impacts. This point of investor awareness during crisis is also made by Servaes and Tamayo (2013). Supporting such human capital or employee morale channel, we find the employee satisfaction effect to be stronger in firms with more intangible assets and in knowledge-based industries.

There are several possible explanations as to why employee satisfaction is not revealed earlier in stock prices. One explanation is that such information is private, and investors do not have access to it. Thus, it is not incorporated into prices. However, this explanation does not answer why such information is suddenly reflected in prices at a shock. In fact, MioTech's website states that it collects alternative data including employee satisfaction and other related information from public data sources.[7] After reconciling employer ratings from alternative sources with MioTech's employee satisfaction scores, we find strong correlations between

6 In an alternative test, we control for the Carhart (1997) four factors, and continue to find positive and significant alpha for high-satisfaction firms.

7 See https://www.miotech.com/en-US/financial-data. We have also discussed with MioTech's data specialists.

them, suggesting that MioTech's original data source could be, at least partly, public. Even if the data is privately-owned by MioTech, given that institutional investors – including China Securities Index (CSI) Company – are major clients of MioTech, we hypothesize that part of the investors are aware of employee satisfaction information. However, retail investors may not have easy access to such information, and lack the ability to quantify it; and therefore, such information is slowly incorporated into prices. This is especially the case given that retail investors' trading accounts for more than 80% of the total trading volume in the A share market (Amstad et al. 2020). Investors update their belief until the employer-worker relation is challenged by COVID-19, when the effect becomes materialized.

How exactly does employee satisfaction make firms more resilient to unexpected negative shocks? We consider corporate preparation for working from home arrangements. Firms are adopting flexible work arrangements, which are likely to persist (Alon et al. 2020). Firms whose employees are not able to work remotely experience greater disruption in employment and growth at COVID-19 (Papanikolaou and Schmidt, 2021). We further our analysis on the role of employee satisfaction in affecting work-from-home productivity. Employees who feel satisfied with their firms may be more productive during remote working without close monitoring and discipline than employees from unfriendly firms are. Such patterns could be stronger in working environments in which employees' working morale plays a larger role. As working morale is unobservable and hard to measure in nature, we consider firms in the knowledge-based industries and that have more intangible assets as proxy. Indeed, we find that employee satisfaction has a greater resilience effect for firms with such characteristics. This finding corroborates the channel that employee satisfaction plays a role via employees' working morale while working under a more flexible schedule.

The predictability of employee satisfaction on stock returns suggests that employee satisfaction may contain information that is not capitalized before the COVID-19 shock. Consistent with this conjecture, we find that comments from current employees have stronger predictive power than those from former employees, and that lengthier comments are more informative than short comments. Employing the full sample period 2017 to 2020, we find that higher employee satisfaction is associated with higher profitability and higher sales growth in the next year. Firms with higher employee satisfaction also experience a higher earnings surprise in the subsequent period. Collectively, the evidence for the long-term effect of employee satisfaction on stock returns suggests that the value of human capital is manifested by employee satisfaction, and that more satisfied employees contribute to better operating

performance. Although the level of employee satisfaction could be observable to some investors in tranquil periods, its value creation role is not fully recognized by the market. The value is provoked by the COVID-19 shock and persists over several months into the pandemic.

We also consider alternative explanations for the better stock price reaction of higher employee satisfaction firms such as government or societal support. Firms that have treated their employees better in the past may derive economic benefits in crisis period due to "halo effects". Governments may bail out – or provide guarantees to – large corporations with political implications, such as state-owned enterprises. Government support can also add value to the connected firms (Fisman, 2001), but through a different channel from employee morale. However, we find similar employee satisfaction effects for both state-owned and privately-owned firms, suggesting that employee satisfaction effect is beyond the government support channel. The second alternative explanation hinges on inside ownership. Insiders have incentives to support their share prices, reducing downward pressure on the stock during the selloff of COVID-19. We examine this possibility by adding inside ownership measure into our analysis, and find that the effect of employee satisfaction remains statistically significant and economically important. The finding suggests that the incremental effect of employee satisfaction on shareholder value is on top of the effect of inside ownership.

Our study adds to the growing literature showing strategic firm considerations with respect to their employees (see, e.g., Ellul and Pagano, 2019) and the value of employee satisfaction to the firm (see, e.g., Edmans, 2011). Edmans (2011) finds that companies named as "Best Companies to Work For" have better future stock returns. However, there also exist opposing views in the literature. Mueller et al. (2017) show that firms with higher pay inequity (lower pay for rank-and-file employees relative to that of top executives) have higher valuation and better operating performance. This finding suggests that firms are better off in treating their non-executive employees less generously. Our study complements this line of literature by focusing on the unprecedented public health shock of COVID-19. Our broad-based analysis from a major emerging market is complementary to existing studies, which are primarily based on US data.[8] Our findings support the view that firms can do well during crisis by doing good in normal times.

[8] For example, Green et al. (2019) analyze Glassdoor data for US firms, with a focus on the information content of employer reviews. Au et al. (2021) examine employee flexibility for S&P 1500 firms using data from indeed.com.

It is important to note that, according to Edmans (2011), the market does not fully recognize the intangible value of employee satisfaction in a timely manner. Rather, it is incorporated into stock prices over the long run. We confirm this finding using data from China, the largest labor market in the world. Our findings shed light on why employee satisfaction is not priced in the stock market in a timely fashion: the value of rank-and-file employees could be hard to identify, and thus neglected by the public in tranquil times. However, employee satisfaction contains useful information about firm fundamentals. When the working environment is negatively impacted by a crisis like COVID-19, the value of employee satisfaction as an important intangible asset could be realized and attract investors' attention. Our study complements Edmans (2011) in two aspects: first, we focus on stock performance during disastrous times. Our findings explain why it takes long for investors to incorporate employee satisfaction into price. We find evidence that high employee satisfaction predicts better operating performance after the outbreak of the pandemic; and second, we use employee review data from China, a labor market that is considerably different from that of the US. As noted by Jiang and Kim (2020), the Chinese government is an important promoter of ESG in China, and there is a long way to go for firms to become truly interested in ESG. Thus, the relation between firm ESG and shareholder value in China is especially worth studying.

The reminder of the paper is organized as follows. Section 2 introduces the background on COVID-19 and the related literature. Section 3 describes the dataset for our empirical analysis. Section 4 presents our main results and Section 5 concludes.

2. Background on COVID-19 and Related Literature

COVID-19 posed major disruptions to economic activities all over the world. The coronavirus was first manifested by a cluster of pneumonia cases of unknown type in Wuhan – the capital city of Hubei Province – in China in December 2019. Although the Chinese government officially acknowledged the infectious nature of the novel coronavirus on January 20, 2020, its severity was not immediately recognized. On January 23, the city of Wuhan was declared to be in lockdown and restricted movement. That afternoon, transport authorities began shutting down some of the main highways leaving Wuhan.[9] But by January 29, the novel coronavirus had spread to all the provinces in China. On January 31, WHO declared the outbreak a "public health emergency of international concern".[10]

[9] https://edition.cnn.com/2020/01/23/china/wuhan-coronavirus-update-intl-hnk/index.html
[10] https://www.bbc.com/news/world-51318246

The outbreak of COVID-19 was sudden, unexpected, and dramatic. The stock market in China closed from January 24 for the Chinese New Year holidays, but due to the outbreak, the scheduled closure of the market was then extended from January 31 to February 2. The market reopened on February 3 with a record loss, and finished the day with a 7.7% drop for the Shanghai Composite Index. Among the 3,859 publicly listed stocks in China, 3,527 of them experienced price declines on that day, and 3,177 stocks hit the trading halt limit after losing 10%. Therefore, we choose February 3, 2020 as the event day for our study.

The impact of COVID-19 goes far beyond those who have been infected by it. Healthy people have been severely inconvenienced by the lockdown, curfew, and other anti-epidemic measures. The economic impacts of the outbreak, although difficult to estimate, have been deep and wide.[11] It presents a sudden challenge to working conditions, and provokes investors' perceptions about employee satisfaction which may not be revealed in more tranquil times. While the economy was essentially frozen – and many firms had zero revenues – firms were asked by the government to continue paying their workers. The large and sudden disruption caused by COVID-19 has thus far caused many firms, especially SMEs that did not have sufficient cash before the outbreak, to come under liquidity pressure. Some firms had to cut wages and benefits, while also asking employees to contribute in order to avoid bankruptcy. In this context, employee-firm relations become crucial to a firm's stability. Firms that have healthy relations with their employees may receive more support from them, whereas firms with weak relations with their employees may find it hard to motivate them to work from home. Hence, we expect that firms with different levels of employee satisfaction before the outbreak will vary in their stock market performance during the event.

Unlike financial crises, the COVID-19 outbreak is exogenous to firm operations and the economic links between firms, making it even more difficult to predict the impacts from an economist's perspective. This study therefore reflects on the value of employee satisfaction when firms experience real disruptions, instead of a decline in trust and social capital within the financial sector used by corporate social responsibility (CSR) literature (Lins, Servaes, and Tamayo, 2017). Our setting is also different from the firm-specific shocks analyzed by Hong et al. (2019), or industry-specific shocks used by Kim et al. (2018). Evidence on how firms with different levels of ESG perform during crisis period is mixed. On one hand, Lins et al.

[11] It is estimated that around 5 million people in China lost their jobs amid the outbreak of the new coronavirus in January and February 2020 (https://www.cnbc.com/2020/03/16/china-economy-millions-lose-their-jobs-as-unemployment-spikes.html).

(2017) find that high-CSR firms performed better during the 2008 financial crisis, as stakeholders were more willing to help high social capital firms weather a negative shock.[12] On the other hand, however, Bansal et al. (2021) argue that firms without negative ESG incidents ("good" stocks) generate lower abnormal returns than firms with incidents ("bad" stocks) during economic downturns. Their explanation is that ESG is a luxury good, and investors pull back their concerns for socially responsible investment when they are facing more wealth constraints. Chen et al. (2017) find that mandatory CSR disclosure reduces pollution, at the expense of shareholders.

A growing amount of literature demonstrates that employee morale is an important, intangible asset to firms, while its value is slowly incorporated into prices.[13] Higher employee satisfaction leads to higher stock returns in the long run (Edmans, 2011). Better employee perceptions on managerial integrity and ethics lead to higher firm valuation (Guiso et al., 2015). Employee-friendly policies are positively related to acquirer returns in domestic M&As (Liang et al., 2020). Employment flexibility helps firms respond to exogenous shocks, and enhances firm value (Au et al., 2021). Favilukis et al. (2021) focus on labor force telework flexibility. They find firms in high flexibility industries outperform firms in low flexibility industries in stock returns. In tranquil times, the importance of employee morale may not be fully realized by the market. However, the benefits of employee satisfaction may become materialized when the firm is hit by a shock, during which formal contractual agreements could be broken by bankruptcies, and non-contractual factors – such as employee morale – will have an impact.

ESG have become more prominent issues in recent years, following the publication of Edmans (2011), who analyzes data up until the year 2009. Our study may add to the understanding of ESG value for emerging markets in recent times. Many existing studies exclude China, which has an enormous labor market with unique characteristics. Using a cross-country sample, Edmans et al. (2020) document that employee satisfaction improves recruitment, retention, and motivation in flexible labor markets, where firms face fewer constraints on hiring and firing. In rigid labor markets, legislation already provides minimum standards for worker welfare; and thus, additional expenditure may exhibit diminishing returns.

[12] More generally, one strand of literature posits that firms can do well by doing good – i.e., investing in corporate social responsibility (CSR) or environmental, social, and governance (ESG) has a positive impact on firm performance and shareholder value (Flammer, 2015; Krüger, 2015; Albuquerque et al., 2019), mitigates agency issues (Ferrell et al., 2016; Flammer and Luo, 2017), and enhances acquirers' stock returns (Deng et al., 2013).

[13] A burgeoning literature is on how firms take employee welfare into corporate policies. See, among others, Guan and Tang (2018).

The effect of employee satisfaction is insignificant for some major Asian countries, such as Korea and India, and developing economies, such as Brazil.

Empirical evidence on the effect of employee satisfaction on shareholder value is still scarce, especially during disastrous times. Contemporaneous studies discuss ESG or firm culture in general, but not employee treatment specifically. Albuquerque et al. (2020) and Ding et al. (2021) find that firms with better ESG ratings have higher stock returns during COVID-19. Li et al. (2021) document that firms with a strong culture have better operating performance per employee in 2020Q1. To our knowledge, most studies on COVID-19 are based on US data, while ours is one of the few that use ESG data for Chinese firms. We may contribute to the understanding of the impact of COVID-19, a market-wide, real disruption to the firm-employee relation for a universe of firms in China and emerging markets.

3. Data and Sample

Prior studies on ESG of Chinese firms face data limitations, and are based on small samples. Our employee satisfaction data comes from MioTech, a leading ESG data provider based in Shanghai and Hong Kong with a specialization in providing ESG information and service. MioTech compiles comprehensive ESG data for all publicly listed Chinese firms, including firms listed in mainland China, Hong Kong, Taiwan, and the US. It also covers suppliers, customers, subsidiaries, and other related companies. In total, it provides ESG data for approximately 800,000 private and publicly listed companies in Greater China. It has been shortlisted for the Responsible Investment Award by the United Nations Principles for Responsible Investment (PRI) in 2021.[14] MioTech uses natural language processing and crowdsourcing to collect ESG data from various sources, including firms' publicly disclosed reports, ESG-related news from government websites, and social media. To ensure data quality, MioTech collects ESG-related news from mainstream websites, and includes reviews from only authorized accounts. MioTech has an internal process for validating data to ensure data reliability and accuracy. Its computer algorithms and human analysts review various publicly available online sources for employee satisfaction data, and rule out data sources based on the quality of the comments made and the depth of information available (e.g., the name of the company, role of the employee, and whether the employee is an ex-employee). Data from the

[14] For the "ESG Research Innovation of the Year" award, see the official announcement by UNPRI: https://www.unpri.org/showcasing-leadership/shortlists-for-the-pri-awards-2021/8266.article as well as the company press release: http://www.miotech.com/en-US/article/613acca56da85800406bc98c

selected sources is then parsed by MioTech's proprietary ETL ("Extract, Transform and Load") platform into a structured format for analysis. Manual data verification is also performed, in order to ensure data authenticity.

Employee satisfaction is one of MioTech's many ESG data items for which it collects original data from public sources.[15] It aggregates all online employer reviews, including both numerical ratings and textual comments that have been posted by firms' employees.[16] Some data sources are similar to that of Glassdoor, an international company review website.[17] However, MioTech does not classify these comments into sub-categories like Glassdoor does. We follow the Glassdoor format, and manually classify comments into Career Development, Salary&Benefits, Senior Management, Work-life Balance, and Corporate Culture. Comments on "Salary&Benefits" account for the greatest proportion (more than 70%) of the sample, and many reviews contain comments about multiple aspects of the firm. We provide detailed descriptions about the employee satisfaction data in the Appendix on MioTech Data.

The employee satisfaction data is sourced directly from employees, rather than survey responses from an intermediary. Moreover, we have many firms with different levels of employee satisfaction, instead of solely those "Best Companies to Work For". It is important to note that unlike the institution-driven US market, the Chinese stock market has a predominance of individual traders. Such retail trading may be more prone to inattention, as investors may not notice the value of employee satisfaction until the outbreak of a crisis like the coronavirus. Moreover, the developments on ESG issues in China are arguably behind the US and Europe.

The employee satisfaction dataset covers more than 1,700 firms that are publicly listed in the Chinese stock exchanges (the "A share" market). For each firm, the data contains satisfaction scores from one or more employees who are working – or ever worked – for the firm. MioTech provides both scores from individual employees, as well as the average firm-level score in the past. We have also cross-checked the wording in comments made by each individual employee, in addition to the satisfaction score. Overall, an employee gives his or her company a higher score when their written comments about the firm are more positive. We

[15] https://www.miotech.com/en-US/financial-data

[16] We do not know exactly which websites/social media MioTech collects original employee satisfaction reviews from, as they are in intense financing rounds, and keep data sources as their commercial secrets. From our conversation with their product manager, we learnt that MioTech collects all available reviews from the websites, and did not do any types of sampling by themselves.

[17] We infer one example, www.kanzhun.com, although MioTech does not reveal its raw data source.

merge the employee satisfaction scores in this database with the employer firm's financial information and stock return data from CSMAR.

The original dataset provided by MioTech contains the employee satisfaction score given by individual employees. Each individual employee chooses an integral score from 1 to 5 to rate the employer, with 5 being the best. We average the scores across employees to obtain firm-level employee satisfaction. Table 1 Panel A shows the mean (3.22), median (3.25), and standard deviation (0.72) of the firm-level employee satisfaction scores in our sample. The skewness and kurtosis of employee satisfaction are -0.379 and 0.953. The past 3-year employee satisfaction score is of similar range, and is less volatile across firms, with the mean 3.24, median 3.30, and standard deviation 0.66. We plot the frequency distribution of employee satisfaction scores in Figure A6 of the Appendix A on MioTech Data. Finally, we report in Appendix A that the correlations between the MioTech employee satisfaction score and CSR scores from other sources are low. For example, the correlation coefficient between MioTech employee satisfaction score and the CSR score from Hexun.com is 0.077. Hence, our employee satisfaction scores provide unique information not captured by other CSR measures.

Our sample spans all regions and provinces in China. The top 3 provinces that receive the most employee reviews are Guangdong, Beijing, and Shanghai. We find positive and significant correlation (0.62, significant at the 1% level) between the number of employee reviews by province and provincial GDP, suggesting that our sample is representative of the economy. As shown by Table 1, Panel B, our sample covers 17 out of 19 broad industry sectors, or 76 out of 90 industries based on the granular CSRC (China Securities Regulatory Commission) industry classification (see Table A1 of Appendix A). Most of the firms are from the manufacturing sector – accounting for 64.4% of the sample – followed by information technology (10.1%) and financials (4.5%). Self-reported employees' position type information is available in the database. We manually classify employees' positions into 28 types, among which the most representative positions are engineers, management, and computer programmers. These account for 28.0%, 10.3%, and 7.9% of the sample, respectively. More than half (52%) of the employees work for less than one year for the firm that they are rating. 32.9% work for 2-5 years, and 13.4% for 6-10 years. In our sample, an average firm receives 39 employee reviews. 98.9% of the employee reviews contain textual comments. There can be mixture of both positive and negative comments in the same review. An average comment contains 6.6 Chinese characters. Although most firms in the sample are manufacturers, the financial industry has the largest average number of comments (with the electricity industry

having the fewest). The average score is similar for industries with a considerable number of firms, within the range of 3-3.5. More summary statistics and validation are presented in the Appendix on MioTech Data.

Table 1, Panel C shows summary statistics of our sample firms. The average total book asset of our sample firms is CNY 31.2 billion. 24.7% of our sample firms are state-owned firms, according to the ultimate controller information provided in CSMAR. The mean leverage, investment (measured by capital expenditure/total assets), and ROA are 0.45, 0.046, and 0.04, comparable to those of the whole sample of firms listed in mainland China (Allen et al., 2021).

We divide sample firms by the median employee satisfaction score in 2019 into high- and low-satisfaction firms, and compare firm characteristics of the two groups. As Table 1, Panel D shows, high-satisfaction firms have larger market capitalization, more employees, higher leverage, more cash holdings, higher sales growth, and lower investment.[18] They are comparable to low-satisfaction firms in terms of market-to-book ratios, ROA, and net income growth. High-satisfaction firms are more likely to be in the "Knowledge" industries. Finally, high-satisfaction firms have a larger number of block holders.

4. Empirical Results

In this section, we present our empirical findings. We first show the results on the first trading day after the outbreak of the pandemic. Then, we provide results over a longer time period. We further present evidence for the channels through which employee satisfaction affects stock returns. At the end, we discuss several alternative explanations for our results.

4.1 Employee Satisfaction and Stock Price Reaction to COVID-19

We begin our analysis from a univariate comparison of stock returns on the event day, February 3, 2020, for high- and low-employee satisfaction firms. We divide sample firms into high- and low-employee satisfaction groups and calculate the value-weighted average returns for each group on the event day, with market capitalization as the weight. As shown in Figure 2, Panel A, the raw return for the low satisfaction-group is -8.73 percentage points, while the raw return for the high satisfaction-group is -7.42 percentage points. Therefore, the stocks of high-employee satisfaction outperform the low satisfaction by 1.31 percentage points. We also

[18] Other studies document comparable statistics based on US data. For example, Green et al. (2019) find that larger firms have higher employee review ratings. In a different setting, Lyu et al. (2022) show that firm environmental performance is negatively related to debt financing.

compare industry-adjusted stock returns based on the broad CSRC industry classification. Panel B shows that the mean industry-adjusted returns for the low- and high-groups are -0.74% and 0.52%, respectively, and the difference 1.26% is statistically significant at the 1% level. Panel C shows the Fama-French five-factor ("FF5") model-adjusted returns, based on the market return, size, book-to-market, profitability, and investment (Fama and French, 2015). The difference in FF5-adjusted returns between the low- and high-employee satisfaction groups is large and statistically significant. These results suggest that firms with high employee satisfaction experience a smaller stock price drop on February 3, 2020 than firms with low employee satisfaction do, and the difference is not explained by pricing determinants at the market or industry level. Figure 3 plots the cumulative returns of high- and low-employee satisfaction firms in January 2020 before the outbreak of COVID-19. As shown, the cumulative returns of the two groups tracked each other closely before February 3, and the differences are statistically insignificant.

We proceed to examine the relationship between employee satisfaction and stock returns in multivariate regressions. Specifically, we estimate the following specifications:

$$\begin{aligned} Stock\ Return_{i,Feb\ 3,2020} \\ &= \alpha_i + \beta_i Employee\ Satisfaction_{i,2019} + \gamma_{1i} Firm\ Controls_{i,2019} \\ &+ \gamma_{2i} Firm\ CSR\ Score_{i,2019} + Ind\ FE_i + \varepsilon_i \end{aligned} \quad (1)$$

(1) where the dependent variable is stock returns on February 3, 2020. *i* denotes a firm. $Ind\ FE_i$ denotes the industry that firm *i* belongs to, based on the CSRC industry classification. We control for firm characteristics which may be important for stock returns, and proxies for a firm's financial strengths which may prepare the firm during a market collapse. We follow Lins et al. (2017) to construct control variables, including firm size, book-to-market ratio, return in 2019, beta (estimated using monthly stock returns over the past 60 months), and idiosyncratic risk (the residual variance from the market model estimated over the five-year period ending in December 2019). We also control for cash holding, leverage, profitability, investment, and the Fama-French five-factor loadings. To mitigate the concern that the observed strong performance of high employee satisfaction firms could be due to investors' anticipation of government implicit guarantees provided to state-owned firms to prevent their stock price collapse, we add one additional control for state-owned firms. We include industry fixed effects in all specifications. Finally, we include the CSR score from Hexun (a financial

media company in China with coverage of CSR content) to control for the broad CSR effect, so that the specification quantifies the marginal effect from employee satisfaction.

Table 2 presents the estimation results for our baseline regression models. As Panel A, Column 1 shows, the economic impact of the employee satisfaction score is large: a one-point increase in employee satisfaction is associated with an increase of 0.07 percentage points in a firm's industry-adjusted return (or around 12.8% relative to the sample mean). In Column 2, we include corporate governance controls, such as the CEO duality indicator, the number of block holders, and the number of possible small coalitions. The coefficient estimate of employee satisfaction remains statistically significant.

In Columns 3 and 4 of Table 2 Panel A, we replace the employee satisfaction measure extracted in 2019 with the *Past 3-year Employee Satisfaction* as an alternative measure. The *Past 3-year Employee Satisfaction* is a score averaged across all employees who submitted their scores during the past three years. With corporate governance measures and the Hexun CSR score being controlled for, the coefficient of *Past 3-year Employee Satisfaction* is 0.052, and is statistically significant at the 1% level. The result suggests that not only does the recent score predict returns, but the past 3-year score also has similar predictability – albeit with a smaller magnitude. These findings suggest that the employee satisfaction score contains information that is related to firm intangibles, which are slow-moving and likely to be under-valued by investors. Green et al. (2019) find that employee reviews for US firms from Glassdoor submitted in earlier times are less informative for stock prices.

To facilitate the interpretation of the results, we replace the continuous employee satisfaction score with a dummy indicator, *Employee Satisfaction* $_{High}$, which equals one when a firm has its satisfaction score above the sample median, and zero otherwise. We report the estimation results in Table 2, Panel B. Column 1 shows that the marginal difference in industry-adjusted stock returns on February 3, 2020 between the high- and low-employee satisfaction firms is 0.352 percentage points, or 63.5% relative to sample mean. In Column 2, we estimate the model with corporate governance measures being controlled for, and the coefficient of *Employee Satisfaction* $_{High}$ remains qualitatively unchanged. We define the indicator using the past 3-year employee satisfaction in order to define high and low satisfaction firms and find similar results (Columns 3 and 4).

For further robustness checks, we adjust returns using alternative benchmarks other than the industry mean. In Table 3, Columns 1 and 2, we adjust raw returns by the value-weighted market return for the whole A share market in China. In Columns 3 and 4, we conduct firm-

characteristics adjustment, i.e., subtract the value-weighted average return of portfolios with similar firm characteristics. We follow Daniel et al. (1997) to construct firm-characteristic portfolios. By the end of 2019, we sort all A share listed firms into quintiles based on the market capitalization, book-to-market, and momentum (past 1-year return). In this way, we form 5×5 ×5 passive portfolios. We assign each stock to a passive portfolio. The excess return of a particular stock is then calculated by subtracting the value-weighted portfolios return from its raw return. The estimation results in Table 3 show that the positive effect of employee satisfaction on stock returns remains robust using the two alternative return measures.

Does the result represent a general impact on firms in mainland China, or is it only limited to those with direct linkage to the coronavirus, i.e., people in the area where the coronavirus is most severe? To answer this question, we explore the possibility that the magnitude of the effect could vary with firm location. COVID-19 was reported to outbreak in Wuhan, which has the largest number of infected people and suffered the most from the coronavirus. We separate firms that are headquartered in and outside Wuhan, and find that the role of employee satisfaction in resisting market shock is not differentiated between Wuhan and other cities. Specifically, in Table 4, Column 2, we exclude firms headquartered in Wuhan from the sample. The coefficient of *Employee Satisfaction* $_{High}$ is similar to that of Column 1, and is statistically significant at the 5% level. In Column 3, we exclude firms located in Hubei Province (of which Wuhan is its capital city). The coefficient of *Employee Satisfaction* $_{High}$ remains positive and significant. The result suggests that the increased stock return attributed to employee satisfaction on February 3, 2020 is not unique to Wuhan or Hubei, i.e., the most affected area, but represents a general pattern for all firms in China.

4.2 The Long-term Effect of Employee Satisfaction

A natural question is whether the observed positive effect on stock return is permanent or temporary in nature.[19] If employee satisfaction adds value to a firm which is not capitalized by investors in tranquil times, then the effect may last for a while after February 3. However, if investors mistakenly believe that employee satisfaction creates value for firms, then the observed positive effect of employee satisfaction on stock returns on February 3 could be temporary and quickly fade away. Figure 4 plots the average Tobin's Q for the high- and low-employee satisfaction firms. As shown, the high group does not have a lower valuation before

[19] We thank anonymous reviewers for this question and the suggested analysis.

February 3. The Tobin's Q for low- and high-employee satisfaction firms is not statistically different.

We extend the event window to 5, 10, 20, and 60 trading days from February 3, and cumulate industry-adjusted returns over the alternative windows. We do not go beyond 60 trading days as new events may contaminate the initial effect. We report estimation results in Table 5. We find that the initial outperformance of firms with high employee satisfaction is not subsequently reversed. Specifically, the buy-and-hold returns of high employee satisfaction firms continue to be higher than those of the low satisfaction firms by 1.524 percentage points 10 trading days after February 3, and such outperformance remains significant until 60 trading days afterwards.

The results show evidence of stock return drift following the COVID-19 shock, which suggests inefficiencies of the market in capitalizing employee satisfaction information in tranquil times. Institutional investors who subscribe to the MioTech database can use the data in a systemic way. Retail investors are less likely to be MioTech's clients; however, they may also have access to employee satisfaction information which is publicly available and provided by some websites.[20] Therefore, we hypothesize that some investors have obtained information regarding employee satisfaction before the crisis hit, but that such information is not as easy to quantify as tangible firm characteristics. If investors are conscious about employee satisfaction but did not pay attention to it, then such information will not be incorporated into valuation. Investors may begin to update their beliefs and incorporate them into pricing when a shock like COVID-19 hits, which materializes the value of employee morale and work ethics.

We supplement our event study with long-term analysis of stock returns by sorting stocks into portfolios based on past employee satisfaction and investigate returns in the future. We follow Edmans (2011) to sort sample firms into high- and low-employee satisfaction groups based on the median satisfaction score in each year. Then, we calculate value-weight and equal-weight portfolio returns and regress them on the Fama-French five factors. Table 6 presents the estimation results. The high-employee satisfaction group generates significant excess returns over all benchmarks and for both weighting schemes, and the excess returns are larger for the value-weight portfolios. For value-weight returns, the alpha is 1.5% annually above the

[20] Examples include kanzhun.com and hexun.com.

industry median, and 0.27% annually above benchmark portfolios with similar firm characteristics. For equal weighting, the alpha is 1.24% and 0.45%, respectively.[21]

We also employ an alternative cutoff point (70th percentile) in employee satisfaction scores to form the portfolios. Table 6, Panel B shows the estimated alpha for high employee satisfaction firms. The magnitude of alpha is similar to those in Panel A. The results suggest that the excess returns are not explained away by Fama-French five factors. If the higher return of high satisfaction firms on Feb 3 is due to mispricing, then such erroneous behavior of investors should not maintain in a systematic way in the long-term. Thus, our findings in Table 6 suggest that employee satisfaction may create value to firms, while the added value is not priced until the normal work schedule is disrupted by external shocks. We proceed to examine the link between employee satisfaction and firm financial performance in the next subsections.

4.3 Placebo Tests

February 3 is the first trading day after the extended period of the Lunar Chinese New Year holiday, during which stock trading was suspended. One may conjecture that stock returns can be dramatic after a long period of no trading, and the observed outperformance of high satisfaction firms could be due to other information that is revealed following the long market closure period. To mitigate the concern, we select two alternative event dates for conducting the placebo tests: one is October 8, 2019, the first trading day after the one-week National Day holiday; and the other is January 2, 2020, the first trading day after the three-day New Year break. Both are market reopening days after a long market closure.

We provide estimation results for those two placebo tests in Table 7. Using both raw returns and industry-adjusted returns, we do not find that firms with high or low employee satisfaction differentiate in their returns on the two alternative dates following holiday market closures. We repeat the analysis using the past 3-year employee satisfaction scores, and do not find any significant employee satisfaction effects for those alternative post-holiday dates, either. These results suggest that high employee satisfaction stocks do not always outperform low satisfaction stocks after holidays.

In another placebo test, we analyze the whole January 2020 day-by-day. We do not find significantly positive employee satisfaction effect on any single day in January. Therefore, the market did not seem to anticipate the lockdown before it was officially announced. The positive

[21] We repeat the analysis by controlling for Carhart (1997) four factors: MKT, HML, SMB and MOM. We find significant and positive alpha for high satisfaction firms using the alternative specification.

reaction on February is not associated with prior trading in January. In fact, we find the effect of employee satisfaction is negative and statistically significant on two days: January 17 and 22 (just before the Chinese New Year holiday). One possible explanation is that, before COVID-19, the holiday might remind some investors to view employee welfare as a cost to shareholders, so they discount firms with high employee satisfaction. But we do not test this conjecture.

We conduct the regressions for stock returns on every single day during our sample period of 2017 to 2020, and plot the distribution of the *t*-statistics for the coefficient estimates on employee satisfaction in Figure 5. As shown, the *t*-statistic for February 3, 2020 lies on the right tail of the distribution, and coefficient estimates are insignificant for most of the days. For instance, we examine the employee satisfaction effect on April 8, 2020, when the lockdown of Wuhan ends. We did not find any significant effect on that day.

However, as Figure 5 shows, February 3, 2020 is not the only day that we find strong employee satisfaction effect. For example, we find positive employee satisfaction effect on March 24, 2020, when the cancellation of the 2020 Tokyo Olympics was announced. The cancellation of the originally scheduled Olympics and postponement to uncertain future revealed the severity of the pandemic in a global scale.

4.4 The Value of Human Capital

In this section, we examine the effect of employee satisfaction on firm stock returns from the angle of human capital. We consider firms and industries that may have different levels of human capital. We also investigate how the employee satisfaction effects vary with the feasibility of the work-from-home schedule.

4.4.a Intangibles and Knowledge-based Industries

If the relation between employee satisfaction score and stock returns depends on firm fundamentals such as employee productivity, we would expect a stronger relation for firms in which human capital plays a particularly important role. Therefore, we further our discussions on the potential impact of human capital, which is expected to be more valuable for firms that have more intangibles in their assets. Human capital is also expected to be of greater importance in knowledge-based modern industries, such as the pharmaceuticals and software sectors (Edmans, 2011). We design tests to examine whether the role of employee satisfaction is indeed differentiated for such firms.

In our first set of tests, we split the sample by whether the ratio of a firm's intangible assets to total assets is above the sample median. In Panel A of Table 8, Columns 1 and 2 show that the incremental effect of employee satisfaction on stock returns is statistically significant for firms with high intangible assets, and is insignificant for firms with low intangible assets. We use *Intangible* to denote industries that have more intangibles out of total assets. Column 3 further quantifies the differential effect of employee satisfaction for low- and high-intangible firms. The positive and significant coefficient on the interaction term of *Employee Satisfaction* $_{High}$ and *Intangible* suggests that employee satisfaction has a larger impact on stock returns during the outbreak of COVID-19 for firms with a higher proportion of intangible assets. For high-intangible firms, the incremental impact of high employee satisfaction on stock return at the outbreak is 0.448 percentage points larger than it is for low-intangible firms.

In the second set of tests, we split the sample by whether a firm is in a knowledge-based industry. We define pharmaceutical, IT and network service, and R&D service as knowledge-based industries, which cover a total of 322 firms in our sample. We use a dummy indicator, *Knowledge-based*, to differentiate these firms in our sample. As Table 8, Panel B, Column 1 shows, for firms in the knowledge-based industries, high employee satisfaction firms experienced a higher stock return than low satisfaction firms by 0.404 percentage points, while this difference is merely 0.214 percentage points for firms in non-knowledge-based industries (Column 2). In Column 3, interacting the *Knowledge-based* indicator with the *Employee Satisfaction* $_{High}$ dummy, we find that the outperformance of high-employee satisfaction firms is 0.179 percentage point *more* for firms in knowledge-based industries than it is for firms in other industries. The coefficient of the standalone variable *Employee Satisfaction* $_{High}$ remains positive and significant (0.209), indicating that firms from industries other than knowledge-based ones also benefit from better firm-employee relations, albeit with a smaller economic magnitude.

4.4.b FinTech Development and Employees' Ability to Work from Home

Why does employee satisfaction benefit firms during disastrous times? In this subsection, we examine possible mechanisms that may be at work. Due to city lockdown and quarantine, countless firms have to suspend work or ask their employees to work from home, which requires more loyalty and self-discipline in employees. Employees who are more satisfied with their firm in the past should be more incentivized to work hard during the special period. The pre-requisite for the first "work-from-home" channel is employees' ability to work remotely.

Working from home has become an alternative working arrangement for some industries in recent years (Mas and Pallais, 2017). Dingel and Neiman (2020) estimate that around 37% of the jobs in US can be done entirely from home. These jobs typically pay more than jobs that cannot be done at home. Barrero et al. (2021) present survey results which suggest that during the COVID-19 pandemic, 42% of US employees are full-time working from home, which is higher than the 15% of Americans having paid full work from home days in the 2017 and 2018 surveys before the pandemic.

Firms and their employees vary in their ability to ensure work-from-home productivity. Employee satisfaction is expected to have a more pronounced effect when employees are better able to perform remote work. However, such remote work ability is hard to measure empirically. Such ability depends on both the development of IT technology in the local community and employees' individual work-from-home skills, including time-consciousness, communication, and organization skills, which are challenging to even observe.

Thus, we collect data and construct measures for IT developments in local community, which is relevant for the availability of software and hardware that is necessary for work-from-home. Prior literature posits that technology development – such as telework during disastrous times – does indeed increase labor productivity. For example, Bloom et al. (2015) use an experiment with Ctrip to document that working from home improves workers' performance and work satisfaction, in addition to reducing attrition rates. Angelici and Profeta (2020) use a randomized experiment to show that flexible working space and time improve worker productivity, well-being, and work-life balance.

The first measure that we use for remote work ability is the mobile payment rate, which is obtained from the research department of Ant Financial, one the highest valued FinTech companies in the world. It operates Alipay, the world's largest mobile and online payment platform.[22] The mobile payment rate is a city-level ratio of the number of people who use mobile payment out of the total population of the city.[23] Thus, it measures the deepness of FinTech application in a city. The deepness of mobile payment usage relies on technology development, including big data and risk management. Firms that are located in a city with more developed mobile payment should be better able to utilize the necessary technology and

[22] https://www.businessinsider.com/alipay-overtakes-paypal-as-the-largest-mobile-payments-platform-in-the-world-2014-2

[23] Due to data security reasons, this percentage number is standardized with a certain city as the benchmark. Therefore, this number does not have any economic meaning. The standardization process does not change the rank of cities in terms of the usage rate of mobile payment.

facilities they need to work from home. Besides, usage of mobile payments largely facilitates daily life, strengthening the positive effect of employee satisfaction on productivity.

The remote work ability is more relevant for the knowledge-based industry and firms with higher intangible assets. For non-knowledge-based industries – such as hotel and transportation – working-from-home arrangements are less relevant and less affected by technology. We focus our analysis on the knowledge-based and high intangible firms, as we defined in Table 8. We split our sample firms into high- and low-groups, based on whether the firm is located in a city with a mobile payment usage rate above the sample median.[24] As Table 9, Panel A, Columns 1 and 2 show, the positive impact of employee satisfaction on stock returns is only significant for firms that are located in high-mobile payment usage cities. The outperformance is as large as 0.984 percentage points, and statistically significant at the 1% level. For firms located in cities with a low mobile payment rate, employee satisfaction does not have a material impact (coefficient 0.384, statistically insignificant, Column 2). The difference in the effect of employee satisfaction is 0.6, and is statistically different at the 1% level. However, when we employ the full sample, the interaction term *Employee Satisfaction* $_{High}$ and *High Mobile Payment* carries an insignificant coefficient, as shown in Column 3.

The second measure for employees' work-from-home ability is a proxy for the development of E-commerce. We have obtained the online sales revenue per capita at the provincial level from the National Bureau of Statistics of China.[25] Similar to that of mobile payment, online sales also rely on and reflect the technology development, which can also affect local employees' work-from-home ability. One large impact of COVID-19 and city lockdown is that salespeople cannot visit their clients in person. Such a negative impact could be mitigated if the firm uses more online sales platforms. Therefore, we expect the effect of employee satisfaction on stock returns to be more pronounced for firms located in an area with more matured online businesses.

We split the knowledge-based and high-intangible firms into high- and low-online sales groups, based on whether the firm is located in a province where the online sales revenue per capita is above/below the sample median.[26] As Panel B of Table 9 shows, for firms located in

[24] The top 5 provinces/municipalities with highest mobile payment rates are Beijing, Shanghai, Guangdong, Zhejiang, and Jiangsu. The bottom 5 provinces/municipalities are Jiangxi, Anhui, Xizang, Hunan, and Hubei.

[25] http://www.stats.gov.cn/tjsj/ndsj/2019/indexch.htm

[26] The top 5 provinces with the largest online sales per person are Guangdong, Beijing, Shanghai, Shandong, and Zhejiang. The bottom provinces with the lowest online sales per person are Xizang, Qinghai, Ningxia, Gansu, and Jilin.

high online sales provinces, high employee satisfaction firms outperform their counterparts with low employee satisfaction by 0.512 percentage points, and this difference is statistically significant at the 5% level. For firms located in provinces with low online sales per capita, however, employee satisfaction does not have a significant impact on stock returns (Column 2).

Overall, our findings show that the employee satisfaction effect is stronger for areas in which mobile payment and online businesses are more developed. This effect mainly holds for knowledge-based industries and firms with high intangibles. This evidence is consistent with the interpretation that the relation between employee satisfaction and stock returns is primarily driven by employee morale, which is a crucial motivating factor in fostering employees' work-from-home ability. As a result, such employee morale ultimately determines employees' productivity during COVID-19.

4.5 Information Content of Employee Satisfaction Scores

If employee satisfaction scores contain useful information about the firm, then the predictability of employee satisfaction on stock returns should be stronger for scores rated by current employees than they are by past employees who have left the firm. As argued by Green et al. (2019), current employees can observe timely value-related information; and thus, the scores submitted by current employees should be more informative than former employees. We distinguish our sample scores submitted by current and former employees, and separately calculate firm-level satisfaction scores for the two groups. We define scores submitted by current employees that are higher than the median as *Employee Satisfaction* $_{High,\ Present}$, and scores submitted by former employees that are higher than the median as *Employee Satisfaction* $_{High,\ Former.}$ Table 10, Panel A shows that only *Employee Satisfaction* $_{High,\ Present}$ has a significant and positive effect on stock returns, while the effect of *Employee Satisfaction* $_{High,\ Former}$ is statistically insignificant. The results confirm our hypothesis that scores submitted by current employees are more informative. They also suggest that our findings may not be explained by investors' erroneously mispricing stocks.

If a firm has very few scores available, then the employee satisfaction score that we calculate could be driven by idiosyncratic reviews, and may not well represent employees' view to the firm. The existence of these firms may have biased the estimates. To mitigate the concern, we delete firms that have too few scores from the sample, and conduct the analysis using the remaining firms. In Table 10, Panel B, Columns 1 and 2, we delete firms with fewer

than two reviews from the sample. In Columns 3 and 4, we delete firms with fewer than five reviews (the 30th percentile in the distribution of the number of reviews). In the remaining sample, high satisfaction firms continue to have superior stock return performance to low satisfaction firms, and the results are robust to both raw returns and industry-adjusted returns. The results in Table 10, Panel B suggest that the employee satisfaction effect is robust to idiosyncratic reviews.

We also examine whether the length of employee reviews affects the informativeness of employee satisfaction. We hypothesize that lengthier comments are more informative, as writing a lengthier comment requires more cognitive efforts (Green et al. 2019). We group comments into long and short categories by the median number of characters contained in each comment, and further define *Employee Satisfaction* $_{High, Long}$ and *Employee Satisfaction* $_{High, Short}$ using the median score within each group. Table 10, Panel C shows that when we use raw returns as the dependent variables, high employee satisfaction from both long and short comments predicts higher returns; and when we use industry-adjusted returns, only high satisfaction scores calculated from long comments are informative. However, the differences in the estimated coefficients of the high employee satisfaction indicator defined for long and short comments are statistically insignificant. Overall, the results suggest that the employee satisfaction scores are informative.

Finally, we use firms' institutional ownership to provide further evidence on the informational role of employee satisfaction scores. Institutional investors have better access to overall employee treatment data. Therefore, we expect the employee satisfaction effect to be stronger for firms with higher institutional ownership.[27] We split the sample into high- and low- groups based on institutional holdings measured as of 2019, and estimate the effect of employee satisfaction on stock returns. As shown by Panel D of Table 10, employee satisfaction has a strong and positive effect on stock returns on Feb 3, 2020 for the high institutional ownership group, while the effect is insignificant for the low group. Differences in the two estimated coefficients are statistically significant at the 1% level.

The results in Table 10 corroborate the notion that the employee satisfaction measure contains information about firm fundamentals. The evidence that satisfaction scores from present employees – and that have lengthier comments – are more informative supports this

[27] We thank an anonymous referee for suggesting this analysis.

notion. Meanwhile, this result is not driven by idiosyncratic reviews from firms that have too few reviews.

Results from Tables 8, 9 and 10 provide evidence that more satisfied employees – represented by the high employee satisfaction – increase the value of human capital, and further create more value for the firm. The value of human capital, intangible assets, and the ability to work from home is difficult to quantify, and is not fully incorporated into stock prices in normal times. A major shock like COVID-19 can be a trigger event for price changes to reflect such value.

4.6 Employee Satisfaction and Operating Performance

Thus far, we find evidence that employee satisfaction predicts stock returns at the COVID-19 shock, and the initial reaction was not reversed after the shock. We further find that employee satisfaction has predictability of stock returns in the long run. The findings support the notion that employee satisfaction embeds information that is not fully priced in before the COVID-19 shock. We proceed to examine whether such information embedded in employee satisfaction is associated with the firm's operating performance.

As a firm's financial performance may affect its contemporaneous employee satisfaction, we examine the effect of employee satisfaction in year *t* on the firm's operating performance in year *t+1*. We use firm-quarters with non-missing employee satisfaction in the previous year to form the sample. Specifically, we estimate the below panel regressions:

$$\begin{aligned} Operating\ Performance_{i,t+1} &= \alpha_i + \beta_i Employee\ Satisfaction_{i,t} + \gamma_{1i} Controls_{i,t} + \gamma_{2i} Year\ FE_t \\ &+ \gamma_{3i} Ind\ FE_i + \varepsilon_{i,t+1} \end{aligned} \quad (2)$$

The dependent variables are profit measures including *ROA* and proxies for firm growth rate, *Sales Growth*, and *Net Income Growth*. We also examine investment (*Capital Expenditure/Assets*) and cash holdings (*Cash/Assets*). Control variables include *Log (Total Assets)*, *Leverage*, *Log (1+Firm Age)*, and the *SOE* indicator. We also include year and CSRC industry fixed effects.

Table 11, Panel A presents the estimated regression results for our full sample from 2017Q1 to 2020Q4 (our employee satisfaction data is from 2016 to 2019). In Column 2, the

coefficient of *Employee Satisfaction* $_{High}$ is 0.018, meaning that the quarterly sales growth of firms with high employee satisfaction scores is higher than that of firms with low satisfaction by 1.8 percentage points, or 4.6% relative to the sample mean. This coefficient is statistically significant at the 5% level. High satisfaction firms also have higher ROA, higher net income growth, and more cash holdings.

To better understand the role of employee satisfaction during COVID-19, we zoom into the short window following the outbreak of COVID-19. Panel B shows that during the post-crisis period (2020Q2 to 2020Q4), higher employee satisfaction is associated with higher ROA, sales growth, net income growth, and larger cash-to-assets ratio. Column 5 shows that high employee satisfaction firms have lower leverage than low satisfaction firms. In the final set of tests, we calculate change in financial performance measures before and after the COVID-19 shock, and examine how high employee satisfaction affects the changes. Specifically, we calculate the change in ROA and other measures from 2019Q4 to 2020Q3, and re-estimate the specifications. Results are presented in Table 11 Panel C. We find that higher satisfaction is associated with a greater increase in ROA and cash holdings, suggesting a positive role of employee morale during the crisis period.

Edmans (2011) argues that earnings should only affect part of the excess returns, to the extent that earnings are unexpected. Thus, we also examine whether employee satisfaction is associated with earnings surprise. We extract analysts forecast of earnings per share (EPS) from CSMAR. The analysts forecast of EPS is updated semi-annually. We construct the semi-annual unexpected earnings surprise by subtracting the forecast value from the actual EPS, and then deflating it by dividing the standard deviation of EPS in the past two years. In Table 12, we find that high satisfaction scores predict a greater earnings surprise in the next period, with a different set of variables being controlled for. The results are robust to controlling for corporate governance measures and industry fixed effects.

Taken together, the evidence in Tables 11 and 12 supports the view that employee satisfaction contains information about firms' operating performance. High employee satisfaction predicts both better operating performance and higher earnings surprise in the next period. However, such information is not fully realized by investors, and is thus not capitalized in tranquil times. Our finding is consistent with Huang et al. (2020), who document that employee forecast of the company's business outlook has incremental predictability over the firm's future operating performance.

4.7 Alternative Explanations

We have presented evidence on firm fundamental, human capital, and remote working ability in order to understand the effect of employee satisfaction on stock returns. In this section, we consider alternative explanations which may also generate such an effect.[28]

The outperformance of firms with high employee satisfaction may be due to the implicit guarantee provided by the government to state-owned firms. In China, state-owned firms receive an implicit guarantee from the central government (Lin and Tan, 1999), and have lower investment efficiency (Allen et al. 2021). Perceiving the possibility that state-owned firms will receive government support and avoid default, investors may price in the guarantee effect and react less negatively to state-owned firms at the shock.

To alleviate this concern, we identify state-owned firms in our sample, and compare the effect of employee satisfaction on stock returns for state-owned firms and non-state-owned firms. Table 13, Panel A shows that, within the state-owned group, firms with high employee satisfaction experience a 0.502 percentage point higher stock return on the event day than firms with low satisfaction do. Within the non-state-owned group, this difference is 0.196 percentage points. Column 3 shows that the difference in the two coefficients is statistically insignificant (the interaction term has a coefficient estimate of 0.249 with *t*-value 1.377). Overall, the results suggest that employee satisfaction outperformance is of similar economic magnitude for both state-owned and non-state-owned firms. The differential performance in the stock market is not explained away by the possibility of an implicit guarantee to state-owned firms.

Another possible explanation for the positive effect of employee satisfaction on stock returns in disastrous times is that firms with high employee satisfaction happen to be the ones with higher inside ownership. Insiders may have faith in the firm, and thus sell less during the disastrous time. Therefore, the firm faces less downward pressure on its stock price. We collect inside ownership information from CSMAR. Inside ownership is defined as the ownership held by members of the board of directors, board of supervisors, and other executives of the firm. We divide the number of shares held by the insiders by the total number of shares of the firm, and use the percentage as the measure for inside ownership.

[28] In addition to the two alternative explanations we discuss below, we have also considered other possibilities, such as employee layoffs. Firms may downsize their workforce when they cannot cope negative shocks well. Employees anticipating such layoff behavior may give low satisfaction score to their employers. We find that high- and low-satisfaction firms experience similar changes in the number of employees from before COVID in 2019Q4 to after COVID in 2020Q2 or 2020Q4. The positive employee satisfaction effect remains significant when we exclude firms with significant layoffs during COVID-19 from the sample. Therefore, our main result is not affected by layoff considerations. We thank an anonymous reviewer for suggesting this idea.

In the first test, we include inside ownership as a control, in addition to a set of controls that we used in the baseline regressions. Table 13, Panel B, Column 1 reports the estimation results. The coefficient of *Employee Satisfaction* $_{High}$ remains positive and significant, suggesting that inclusion of inside ownership as a control does not undermine the outperformance of high-satisfaction firms.

Inside ownership is found to have both benefits and costs for corporate governance (Rosenstein and Wyatt, 1997). On one hand, managements' holdings of shares can serve as incentives for executives to work hard and help align interest between managers and shareholders; on the other hand, however, high inside ownership also represents more management freedom from market discipline, which allows for exploitative behavior of the manager, and hurts outside shareholders. If the observed employee satisfaction effect is explained by inside ownership, then we may expect a stronger employee satisfaction effect when inside ownership is larger.

To examine this, we split the sample into high- and low-inside ownership groups, based on the sample median, and conduct the analysis. Different from the prediction, we find a slightly stronger employee satisfaction effect for firms with low inside ownership (Table 13, Panel B, Columns 2 and 3) than we do for firms with high inside ownership. The difference in the effect of employee satisfaction for low- and high-groups is insignificant (-0.307 with *t*-statistic -1.493), and the interaction term of *Employee Satisfaction* $_{High}$ and *Inside Ownership* measure is insignificant (Column 4).

Taken together, the results in Table 13 suggest that our findings are not explained by the implicit guarantee effect or the inside ownership effect. Therefore, the observed relationship between employee satisfaction and stock returns is more likely driven by employee morale and maintaining productivity while working from home during COVID-19 period.

5. Conclusion

We have examined the value of employee satisfaction using novel data. Analyzing stock market performance during COVID-19, we show that employee morale helps firms to be more resilient to market-wide, exogenous negative shocks. Specifically, we find that Chinese firms with high employee satisfaction outperform those with low employee satisfaction on the first trading day following the outbreak of the pandemic. Our results are robust to the control of firm characteristics, alternative measures of stock performance, and sample selection. The

outperformance is not subsequently reversed and continues for multiple months following the outbreak of COVID-19.

The effect of employee satisfaction on stock value is stronger for human capital-intensive firms. Due to travel restriction or even lockdowns during COVID-19, work-from-home becomes an important arrangement for corporate operations. Remote working ability is one channel for the positive effect of employee satisfaction on shareholder value during the pandemic. We also find that the operating performance of high employee satisfaction firms is better than that of low employee satisfaction firms. Beyond the event around the outbreak of COVID-19, we additionally find that high employee satisfaction predicts both stock returns and operating performance during the sample period of 2017 to 2020. Those findings suggest that employee satisfaction contains useful information regarding firm fundamentals.

Our study demonstrates the value of treating employees well in normal times for shareholders – the employer receives reciprocity during disastrous times. Our finding corroborates the conjecture that employee satisfaction creates value for firms via the human capital channel. This study is among the first on the financial impact of COVID-19, as well as on the financial implications of corporate ESG for China. Our evidence from China adds to the burgeoning literature on ESG, which is largely based on the US and other developed economies. While economic growth and financial development are top priorities for emerging markets, we show that incorporating ESG into corporate policies can help such economies to weather negative shocks and foster sustainable growth.

Appendix A: MioTech ESG Data

Background of MioTech

Our employee satisfaction data are from MioTech, a leading FinTech company which uses artificial intelligence to provide environmental, social, and governance (ESG) data and technology. MioTech was founded by Jason Tu (Stanford MBA) and Tao Liu (Cornell Master in Computer Science) in 2016. MioTech has offices in Hong Kong, Shanghai, Beijing, and Singapore. It provides platform access and data delivery, including high-frequency data as per clients' requests. MioTech adopts natural language processing and knowledge graph technologies to scan more than 850 ESG data sources and nearly 1,000 news and social media sources.

MioTech is the best ESG data source for Chinese firms. It provides full coverage of Chinese firms listed in mainland China, Hong Kong, Taiwan, and US. Besides, it covers publicly listed Chinese firms' suppliers, customers, subsidiaries and other related companies. In total, MioTech's database covers more than 800,000 private and listed companies in Greater China. MioTech joined United Nation Principles for Responsible Investment ("UNPRI") in 2020, and became the *first* Chinese company who joined the UNPRI that focuses on using AI technology to provide ESG data and services. It has successfully raised four rounds of funds. MioTech obtained financing from J.P. Morgan Asset Management and HSBC Asset Management's Financial Technology Venture Capital Fund. Other world-renowned investors include ZhenFund, Horizons Ventures, TOM Holdings, and Moody's. MioTech is shortlisted for the 2021 Responsible Investment Award by the UNPRI.[29] In August 2021, it obtained private equity investment from GuoTai JunAn Securities and Government of Singapore Investment Corp (GIC) round B+ investment.

A growing number of institutions has started to collaborate with MioTech. Its main clients are domestic and overseas institutional investors, including China Securities Index (CSI) Company, Huaxia Bank, Everbright Securities, Postal Savings Bank of China, Singaporean multinational bank, national sovereign wealth and pension fund in Europe, among others. J.P. Morgan recently produced reports in the series of Asia Pacific Equity Research. Some of the

[29] See Figure A1. http://www.MioTech.com/en-US/article/613acca56da85800406bc98c

reports based on MioTech data can be found via Bloomberg's terminal.[30] These institutional clients can access MioTech data by paying subscription fees.

MioTech collects ESG data mainly from three sources: (i) firms' self-reported information, e.g., financial/ESG/CSR reports, prospects, announcements of board meetings which are publicly released documents; (ii) other ESG information released by a third-party, i.e., penalty information from government websites, regulators, non-profit organizations, and academic organizations. Such information may contain firm's hidden ESG risks; (iii) ESG-related news and relevant information from social media and other outlets. The employee satisfaction data we use belong to the third type. It is in the alternative data category which is only a small part of MioTech's entire database. MioTech reviews various publicly available online sources for employee reviews and rules out sources based on the quality of the comments made and the depth of information available (e.g., name of the company, role of the employee). To ensure data quality, MioTech collects employee reviews from mainstream websites and authorized accounts only. Data from the selected source are then parsed by its proprietary "Extract, Transform and Load" (ETL) platform into structured format. Sampled data verification is also performed to ensure data authenticity.

Overview of the Sample

Our dataset covers 58,125 unique individual employees in total who gave comments and satisfaction scores to 1,781 Chinese firms listed in the mainland stock exchanges in Shanghai and Shenzhen. It covers 76 out of 90 CSRC industries and 17 out of 19 broad industries by initial-letter industry code. Manufacturing, information technology and financials are the top 3 industries that receive most comments. They account for 64.4%, 10.1% and 4.5%, respectively, of the whole sample of comments. We report the sample distribution by broad industry in Table 1. We also plot the industry distribution in the pie chart in Figure A2, for industries that account for more than 1% of the sample. We provide sample distribution by the CSRC industry classification in Table A1.

Employees that provide comments in our sample are based in all 32 provinces in mainland China. A few comments (less than 0.5%) are from employees based in Hong Kong or Macau. Employees in Guangdong, Beijing and Shanghai provide most comments, representing 18.1%, 16.4%, and 12.2% of the whole sample (Figure A5). In terms of the registered place, the top 3

[30] These reports are titled "green washing" (September 28, 2021), "using controversial events to predict returns" (September 9, 2021), and "data privacy laws and their sector implications" (August 29, 2021).

provinces for number of firms in our sample are Guangdong (331 firms out of 1,781), Jiangsu (216) and Zhejiang (198). Figure A4 shows a positive correlation between provincial GDP and the number of comments received by firms in the province.

In terms of employees' personal traits, we can observe the position and working years of each employee, but not age information. The position information is self-reported and non-standard. We read the position descriptions and manually classify them into 28 types, among which engineers (28.0%), management team (10.3%), and computer programmers (7.9%) account most of the sample (Figure A3). 30,212, or 52.0% of the employees, work for less than one year for the firm they commented on. 32.9% work for 2-5 years, 13.4% for 6-10 years, and 1.72% for more than 10 years.

We plot the distribution of firm-level satisfaction scores in Figure A6. Employees give integral scores 1 to 5. The median is 3. When averaged at firm-level, the mean and median of employee satisfaction score are 3.22, and 3.25, with standard deviation 0.723. The skewness and kurtosis are -0.379 and 0.953. We report these summary statistics in the paper.

MioTech data contain both textual comments and numerical ratings. We list some examples of comments and corresponding numerical ratings in Table A2. The most common negative comment is "low salary", and the most common positive comment is "good welfare". MioTech does not report sub-category scores. However, we manually read the comments and classify the comments into sub-categories: Career Development, Salary & Benefits, Senior Management, Work-Life Balance, and Corporate Culture. Comments on Salary & Benefits account for the largest proportion (73.0%) of the sample, followed by Career Development (66.5%) and Senior Management (61.7%). Many comments are about more than one aspect of the firm, therefore, adding up percentages across sub-categories exceeds 100%.

Comparison with Other Relevant ESG Scores

To validate the employee satisfaction data from MioTech, we collect ESG scores, society and employee treatment-related information from other sources, and compare them with the satisfaction score that we obtain from MioTech. We find that the correlation coefficient between our employee satisfaction score and the CSR score reported by Hexun.com is 0.077, statistically significant at the 1% level. We also collect ESG data from China Central Depository & Clearing Co. ("CDCC"). 232 firms in our sample have both CDCC ESG score and MioTech employee satisfaction score. The correlation between our score and the ESG score from CDCC is 0.148. CDCC also reports separate scores for environment, society and

governance. Within the “Society” category, there is a sub-category “employee treatment”. The correlations between the “Society” score, the “Employee Treatment” score and our employee satisfaction score are 0.188 and 0.269, respectively, both significant at the 1% level. We compare the employee satisfaction with the MioTech ESG score. The correlation between the employee satisfaction score and MioTech ESG score is 0.159, significant at the 1% level. The correlation between employee satisfaction score and MioTech Society score is 0.157, higher than the correlation with the Environment and Governance score, which is 0.086 (*p*-value 0.0002) and 0.026 (*p*-value 0.25), respectively. We summarize the cross-check results of our score and other employee satisfaction-related scores from alternative sources in Table A3. Finally, we hand-collected the employee satisfaction score from Kanzhun.com, a leading employer rating website, for the largest 100 firms ranked by market capitalization. The correlation between the scores from the two sources is 0.6, significant at the 1% level. Overall, it appears that the MioTech employee satisfaction scores are both unique and credible.

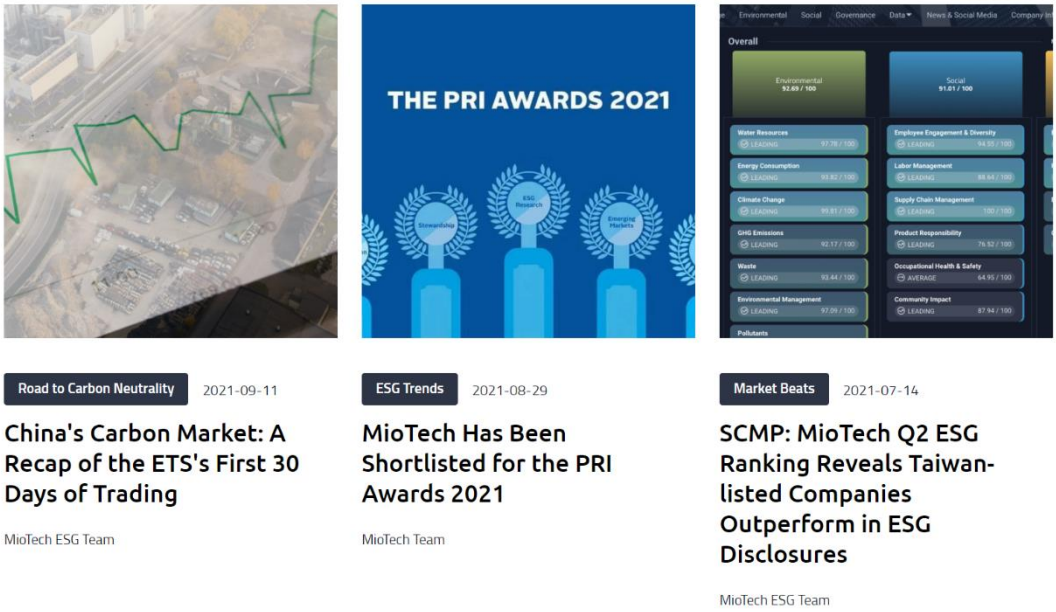

Figure A1. Snapshot of MioTech's Recent News

Source: http://www.MioTech.com/en-US/blog

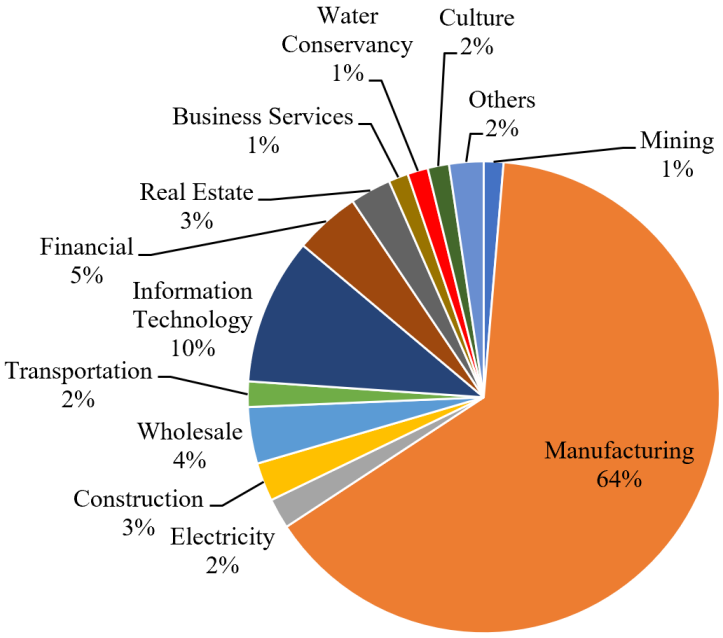

Figure A2. Sample Distribution by Industry

This figure plots the distribution of firms by initial-letter CSRC industry. We classify industries that account for less than 1% of the sample as "Others".

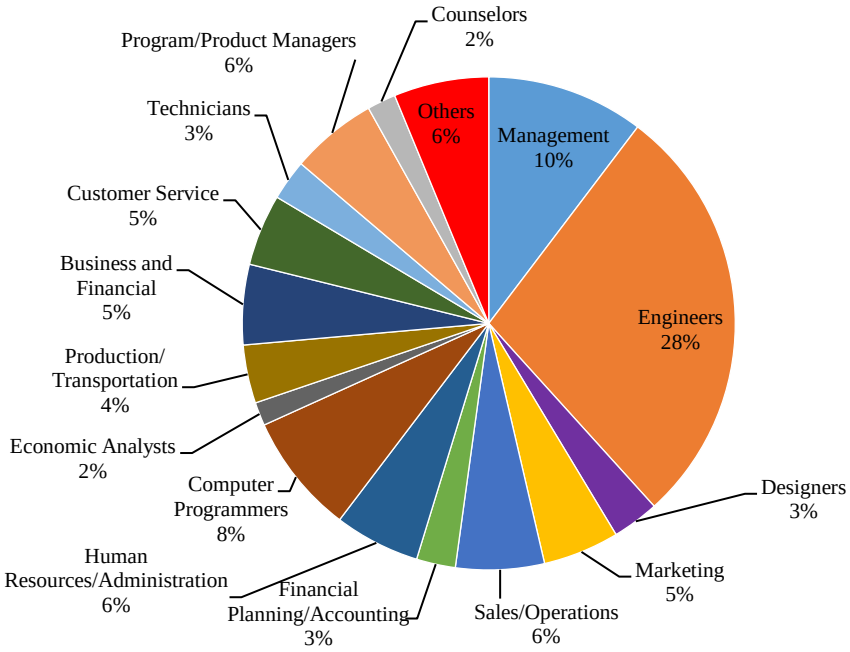

Figure A3. Sample Distribution by Employee Position Type

This figure plots the distribution of firms by employee position type in our sample. We classify positions that account for less than 1% of the sample as "Others".

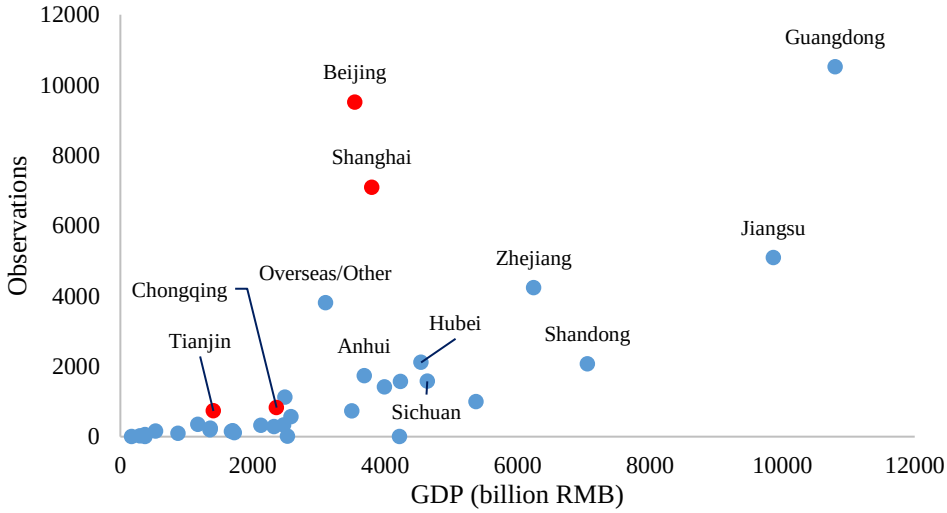

Figure A4. Provincial GDP vs. Number of Employee Reviews

This figure plots provincial average GDP during 2016-2019 and the number of reviews received by firms in each province/municipality.

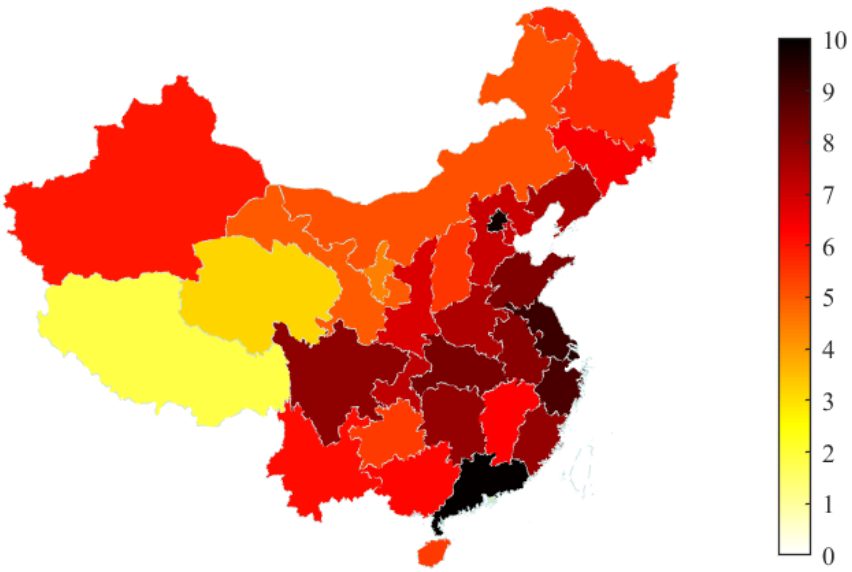

Figure A5. Geographic Distribution of Employee Reviews

This map plots the natural logarithm of the number of reviews in each province/municipality. Darker colors represent more comments received in that area.

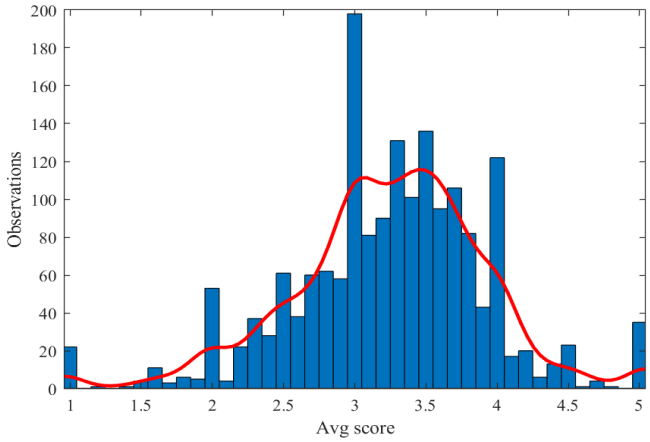

Figure A6. Distribution of Average Employee Satisfaction Scores of Firms

This figure plots the distribution of average scores of firms. We choose the bin as 0.1. For each firm, we take the average of employee satisfaction scores across employees.

Table A1. Sample Distribution by CSRC Industry

This table lists our sample distribution by CSRC industry. Columns 1 and 2 report the number/percentage of firms in each industry. Column 3 reports the employee satisfaction scores averaged across employees in each industry sector. Column 4 reports the average number of Chinese characters contained in each comment.

Industry	# of firms	%	Employee Satisfaction	# of Comments/Firm
A01 (Agriculture)	3	0.17	3.57	8.7
A02 (Forestry)	1	0.06	3	2.0
A03 (Animal husbandry)	7	0.39	3.33	18.4
A04 (Fisheries)	3	0.17	2.64	5.3
B06 (Coal mining)	8	0.45	3.32	6.1
B07 (Oil and gas extraction)	3	0.17	3.37	48.0
B09 (Non-ferrous metal mining)	4	0.22	3.71	14.8
B11 (Mining auxiliary activities)	9	0.51	3.55	19.0
C13 (Agricultural and sideline food	17	0.95	3.5	16.4
C14 (Food manufacturing)	26	1.46	3.43	26.7
C15 (Wine, beverage and tea)	22	1.24	3.5	21.4
C17 (Textile)	14	0.79	3.25	15.1
C18 (Textile and apparel)	19	1.07	3.1	19.5
C19 (Leather, fur and feathers)	3	0.17	3.67	13.3
C20 (Wood processing)	3	0.17	3.6	3.7
C21 (Furniture manufacturing)	12	0.67	3.35	22.3
C22 (Paper products)	15	0.84	3.33	10.1
C23 (Printing)	5	0.28	3.17	16.4
C24 (Culture, education and sports	4	0.22	3.42	45.3
C25 (Petroleum processing)	4	0.22	3.19	7.3
C26 (Chemical products)	102	5.73	3.4	13.2
C27 (Pharmaceutical manufacturing)	118	6.63	3.29	20.5
C28 (Chemical fiber manufacturing)	8	0.45	3.06	5.8
C29 (Rubber and plastic products)	34	1.91	3.2	14.2
C30 (Non-metallic mineral products)	39	2.19	3.38	17.6
C31 (Ferrous metal smelting)	10	0.56	3.38	14.3
C32 (Nonferrous metal smelting)	35	1.97	3.21	8.8
C33 (Metal products)	30	1.68	3.15	16.2
C34 (General equipment	64	3.59	3.15	16.7
C35 (Special equipment manufacturing)	116	6.51	3.32	27.6
C36 (Automobile manufacturing)	70	3.93	3.29	44.0
C37 (Transportation equipment	15	0.84	3.12	18.7
C38 (Electrical equipment	128	7.19	3.31	38.7
C39 (Computer, communication and electronic equipment manufacturing	195	10.95	3.32	48.4
C40 (Instrument manufacturing)	28	1.57	3.06	23.6
C41 (Other manufacturing)	9	0.51	3.2	11.7
C42 (Waste utilization)	2	0.11	3.27	16.5
D44 (Electricity production and supply)	24	1.35	3.41	4.8
D45 (Gas production and supply)	9	0.51	3.49	5.2
D46 (Water production and supply)	4	0.22	3.67	4.8
E47 (Housing construction)	1	0.06	3	2.0
E48 (Civil engineering construction)	31	1.74	3.43	17.4
E49 (Construction and installation)	1	0.06	3.93	17.0
E50 (Architectural decoration)	14	0.79	3.32	34.6

Table A1. Sample Distribution by CSRC Industry – *Continued*

Industry	# of firms	%	Employee Satisfaction	# of Comments /Firm
F51 (Wholesale)	34	1.91	3.53	34.4
F52 (Retail trade)	35	1.97	3.2	41.6
G53 (Railway transportation)	1	0.06	3.46	94.0
G54 (Road transport)	13	0.73	3.39	8.0
G55 (Water transport)	4	0.22	3.17	5.8
G56 (Air transport)	6	0.34	3.33	77.2
G58 (Handling and transportation agency)	2	0.11	3.32	11.5
G59 (Warehouse)	4	0.22	3.17	7.3
G60 (Postal service)	1	0.06	3.41	967
H61 (Accommodation)	1	0.06	3	19
H62 (Catering)	1	0.06	3	5
I63 (Telecommunications services)	11	0.62	3.15	81.9
I64 (Internet services)	25	1.4	3.64	67.8
I65 (Software and IT services)	143	8.03	3.33	96.1
J66 (Monetary and financial services)	32	1.8	3.47	183.7
J67 (Capital market services)	35	1.97	3.74	108.9
J68 (Insurance)	3	0.17	3.48	100.7
J69 (Other financial industries)	10	0.56	3.17	53.3
K70 (Real estate)	50	2.81	3.6	31.7
L71 (Leasing)	2	0.11	4.25	3.0
L72 (Business service)	22	1.24	3.63	37.1
M73 (R&D)	2	0.11	3.16	29.5
M74 (Professional technical service)	15	0.84	3.07	28.9
N77 (Ecological protection)	20	1.12	3.19	31.3
N78 (Public facilities management)	5	0.28	3.14	3.8
P82 (Education)	3	0.17	3.15	63.3
Q83 (Hygiene)	4	0.22	3.69	54.3
R85 (Journalism and publishing)	9	0.51	3.46	18.0
R86 (Radio, television, film and video recording production)	15	0.84	3.45	28.2
R87 (Culture and art)	1	0.06	3.67	4.0
R88 (Sports)	1	0.06	2	11.0
S90 (Synthesis)	2	0.11	3.5	7.5
Total	1,781	100	3.37	38.8

Table A2. Examples of Positive and Negative Employee Comments

This table lists 10 most typical examples of comments (5 positive and 5 negative) and the number of comments under each type in our sample. We also report the subcategories these comments belong to and corresponding averaged employee satisfaction scores.

Comments	#	Positive/Negative	Subcategory	Employee Satisfaction
"Low wage"	1,222	Negative	Salary & Benefits	3.47
"A lot of overtime"	994	Negative	Work-life Balance	3.64
"Good welfare"	381	Positive	Salary & Benefits	3.83
"Good working environment"	363	Positive	Corporate Culture	3.95
"Low pressure"	190	Positive	Work-life Balance	3.12
"Good career prospects"	147	Positive	Career Development	3.95
"Complicated colleague relationship"	131	Negative	Corporate Culture	3.18
"Little room for promotion"	50	Negative	Career Development	3.34
"Good leadership, satisfied"	46	Positive	Senior Management	3.78
"Leaders are too demanding, dissatisfied"	30	Negative	Senior Management	1.23

Table A3. Comparing MioTech Employee Satisfaction Scores with Other ESG Data

This table compares CSR/ESG scores from alternative sources with the MioTech employee satisfaction score we use in our paper. We collect CSR/ESG scores, society and employee satisfaction-related scores from Hexun.com, China Central Depository & Clearing Co. ("CDCC") and kanzhun.com. Row 1 presents summary statistics of the MioTech employee satisfaction score for the top 100 firms by market capitalization in our sample. Row 2 reports our manually constructed satisfaction score for the top 100 firms: we read textual comments in each employee review and rate the firm by ourselves. Then we take average to obtain the firm-level score. Row 3 presents employer ratings from kanzhun.com for the top 100 firms. Row 4 presents firm CSR scores from Hexun.com for 1,328 firms that are overlapped with our sample, and the correlation with our employee satisfaction measure. Rows 5-7 are CDCC ESG scores for the 232 firms that are overlapped with our sample. Rows 8-9 are MioTech ESG scores.

	Mean	Median	StDev	Min	Max	Correlation	p-value
Employee Satisfaction Top 100 Firms	3.590	3.570	0.430	2.500	5.000		
Manually Constructed Score Top 100 Firms	3.335	3.379	0.310	2.200	4.100	0.74***	<0.0001
Kanzhun.com Top 100 Firms	3.453	3.500	0.378	2.260	4.260	0.62***	<0.0001
Hexun CSR (1,328 firms)	20.434	22.350	9.645	-15.690	42.430	0.077***	0.008
CDCC ESG Score (232 firms)	6.852	7.000	0.772	4.000	9.000	0.148**	0.023
CDCC Society Score (232 firms)	5.016	5.000	1.705	1.000	9.000	0.188***	0.004
CDCC Employee Score (232 firms)	6.394	7.000	2.384	1.000	10.000	0.269***	<0.0001
MioTech ESG Score (1,781 firms)	0.305	0.287	0.075	0.174	0.774	0.159***	<0.0001
MioTech Society Score (1,781 firms)	0.345	0.324	0.093	0.129	0.822	0.157***	<0.0001

Appendix B: Variable Definitions

Variable	Definition
Employee Satisfaction	The score that reflects how satisfied a firm's employees feel about their employer, averaged across the firm's employees that submitted the score in 2019.
Past 3-year Employee Satisfaction	The employee satisfaction score averaged across employees who submitted their scores in year 2016 to year 2018.
Employee Satisfaction $_{High}$	A dummy indicator taking one if a firm's employee satisfaction score is above the sample median, and zero otherwise.
Past 3-year Employee Satisfaction $_{High}$	A dummy indicator taking one if a firm's past-3-year employee satisfaction score is above the sample median, and zero otherwise.
Size	The natural logarithm of market capitalization of the firm.
Market-to-Book	Market value of equity divided by book value of equity.
Stock Return in 2019	Annual stock return in 2019, cumulated from daily stock returns.
Beta	Estimated from the market model using monthly returns in the past 60 months.
Idiosyncratic Risk	Residual variance from the market model estimated over the five-year period ending in December 2019.
Cash Holdings	Cash and cash equivalents/total assets.
Investment	Capital expenditure/total assets.
Leverage	Total book debt-to-total assets.
Sales Growth	(Net sales in year t-net sales in year t-1)/net sales in year t-1.
Net Income Growth	(Net income in year t-net income in year t-1)/absolute value of net income in year t-1.
Inside Ownership	Percentage of shares held by members of the board of directors, board of supervisors, and executives of a firm out of total shares of the firm.
# of Block Holders	The number of institutions that hold more than 1% of a firm's ownership.
# of Small Coalitions	The number of possible small institutional investor coalitions that would collectively control 1% or more of shares outstanding.
CEO Duality	A dummy indicator taking one if the firm's CEO also acts as the director of the firm's board.
State-owned	A dummy indicator taking one if the firm's ultimate controller is central/local State-owned Assets Supervision and Administration Commission or other government agents, based on CSMAR information.
Knowledge-based	A dummy indicator taking one if the firm is in knowledge-based industries. We define pharmaceutical (C27), IT and network service (I63-I65), and R&D service (M73-M75) as knowledge-based industries, and zero otherwise.
Intangible	A dummy indicator taking one if the firm's intangible-to-total assets ratio is above the sample median, and zero otherwise.

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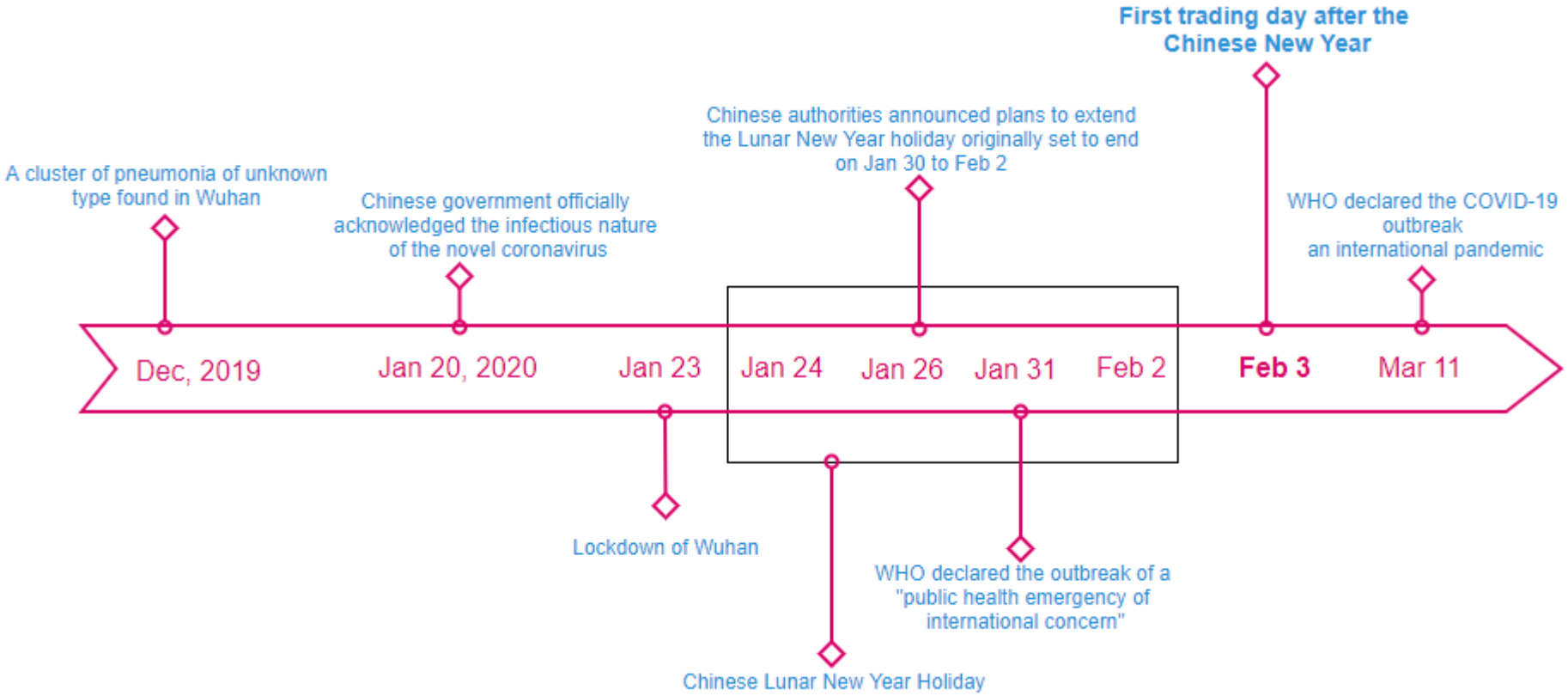

Figure 1. Timeline of the Outbreak of the Coronavirus Disease 2019 (COVID-19) in China

This figure shows the major development of novel coronavirus (COVID-19) from December 2019 to March 2020.

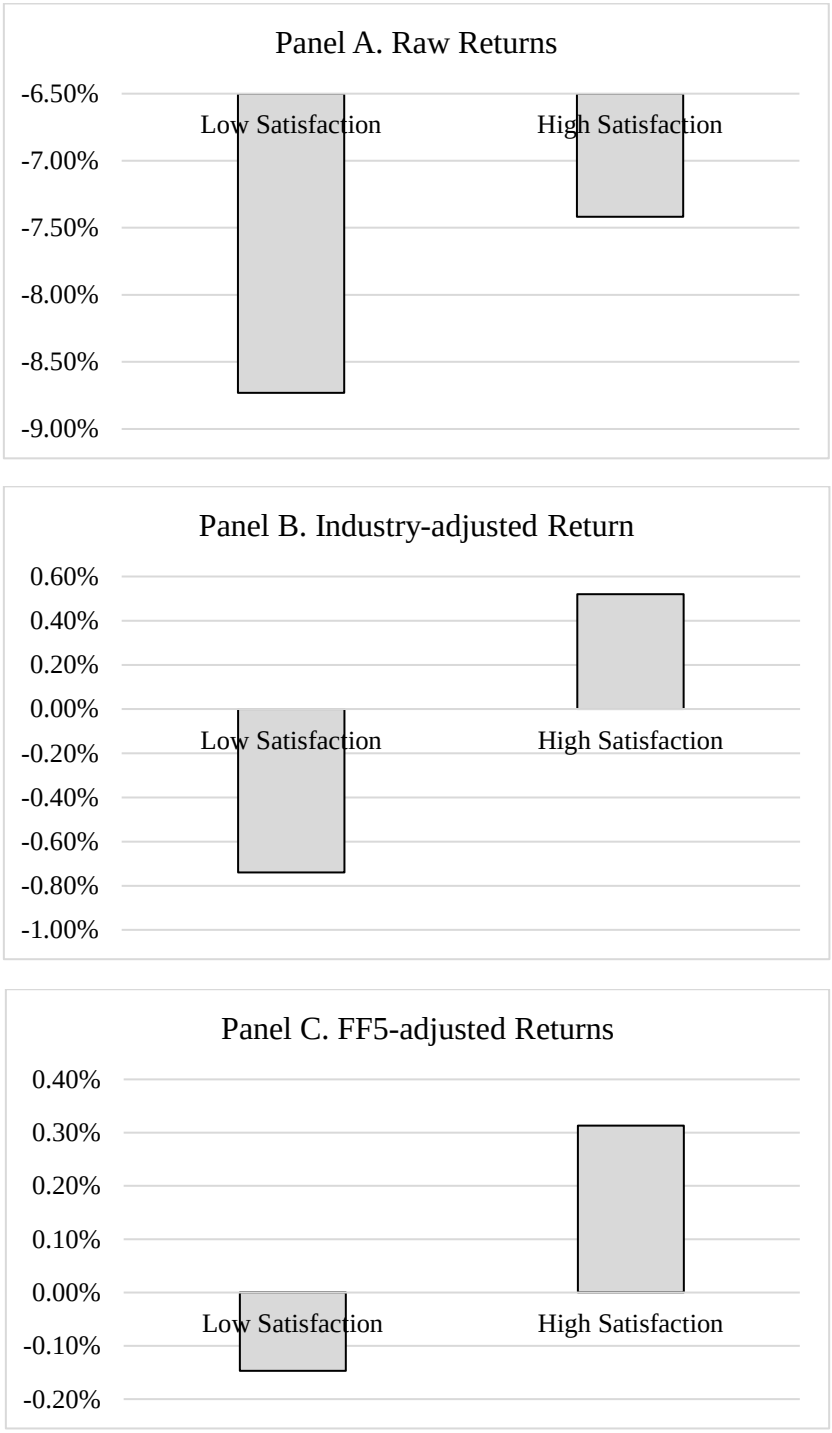

Figure 2. Stock Returns of High- and Low-Employee Satisfaction Firms

We divide our sample firms into low-and high-groups based on the sample median of *Employee Satisfaction*, the firm-level employee satisfaction score given by the firm's employees in 2019. Panel A plots value-weighted raw returns of firms within each group on February 3, 2020, with market capitalization as the weight. Panel B plots the value-weighted average industry-adjusted returns, with the market capitalization as the weight. The industry-adjusted return is calculated as the raw return subtracting the value-weighted industry average, based on the CSRC industry classification. In Panel C, returns are adjusted by the Fama-French five factors (MKT, SMB, HML, RMW, CMA).

Figure 3. Cumulative Returns before COVID-19

This figure plots the value-weight cumulative stock returns before the outbreak of COVID-19 for high- and low-employee satisfaction firms, which is determined by the median employee satisfaction in 2019.

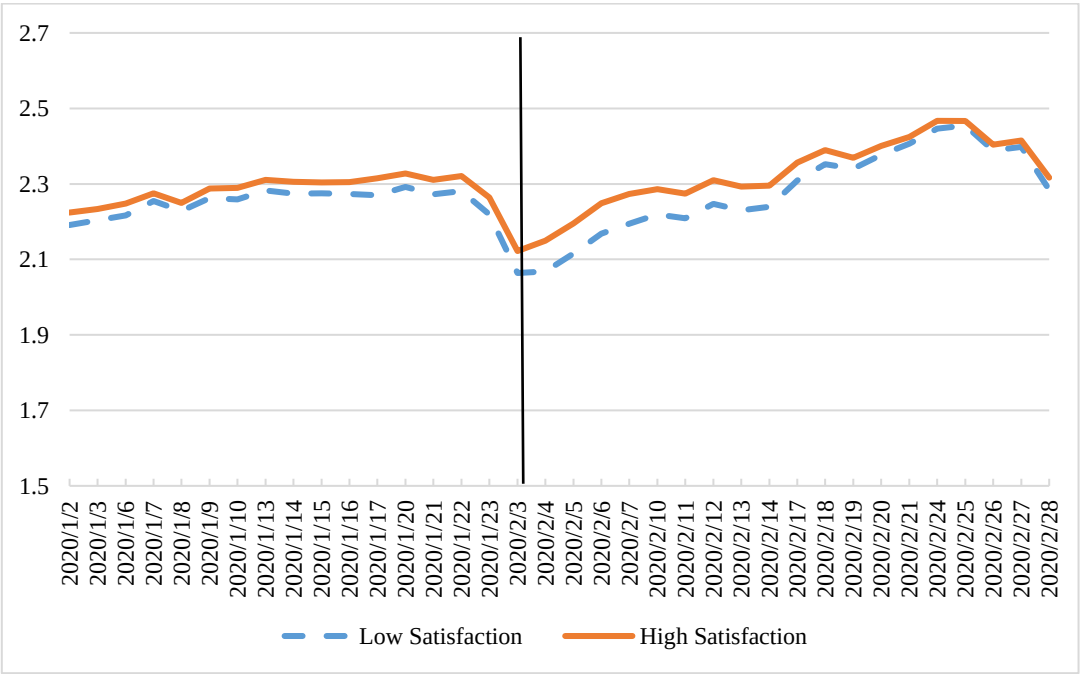

Figure 4. Tobin's Q of High- and Low-Satisfaction Firms

This figure plots the average Tobin's Q around February 3, 2020 for high- and low-employee satisfaction firms, determined by the median satisfaction score in 2019.

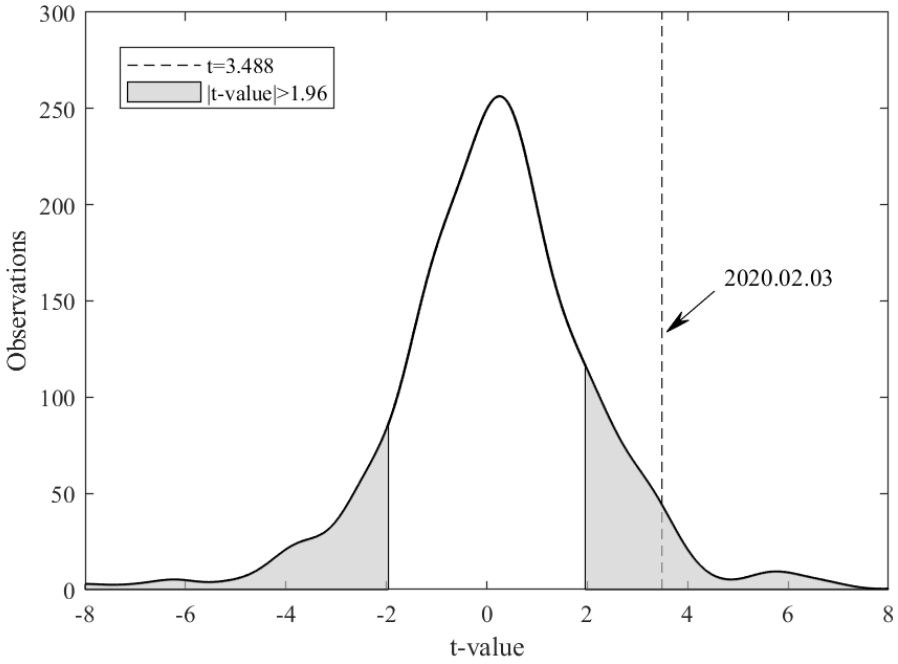

Figure 5. Distribution of *t*-value

This figure shows the smoothed distribution of the *t*-value estimated from regressing daily stock returns on employee satisfaction for the sample period 2017-2020. Employee satisfaction measure is lagged for one year. The shaded part indicates |*t*-value|>1.96, denoting statistical significance at the 5% level.

Table 1. Summary Statistics

This table reports the summary statistics of key variables used in this study. In Panel A, *Employee Satisfaction* is the firm-level satisfaction score given by individual employees in 2019, averaged across employees for each firm. *Past 3-year Employee Satisfaction* is the firm-level employee satisfaction score averaged across employees who submitted their scores in year 2016 to year 2018. Panel B shows the distribution of our sample firms by initial-letter CSRC industry. Panel C shows summary statistics of firm characteristic variables. The variables are extracted at the end of 2019. Panel D compares the key variables for low- and high-employee satisfaction firms, determined by the median employee satisfaction score in 2019. See Appendix B for variable definitions.

Panel A. Summary Stats of Employ Satisfaction Scores

	Mean	Median	StDev	Skew	Kurt	Min	Max	N
Employee Satisfaction	3.216	3.250	0.723	-0.379	0.953	1	5	1,781
Past 3-year Employee Satisfaction	3.242	3.300	0.658	-0.421	1.126	1	5	1,781

Panel B. Sample Distribution by Industry

Industry	# of firms	%	Employee Satisfaction	Average # of Comments
Agriculture	14	0.79	3.30	12.4
Mining	24	1.35	3.48	17.6
Manufacturing	1,147	64.40	3.30	27.5
Electricity	37	2.08	3.45	4.9
Construction	47	2.64	3.38	22.2
Wholesale	69	3.87	3.35	38.1
Transportation	31	1.74	3.38	54.9
Accommodation	2	0.11	3.00	12.0
Information Technology	179	10.05	3.35	91.3
Financial	80	4.49	3.55	131.5
Real Estate	50	2.81	3.60	31.7
Business Services	24	1.35	3.63	34.2
Scientific Research	17	0.95	3.08	29.0
Water Conservancy	25	1.40	3.19	25.8
Education	3	0.17	3.15	63.3
Social work	4	0.22	3.69	54.3
Culture	26	1.46	3.43	23.1
Comprehensive	2	0.11	3.50	7.5
Total	1,781	100	3.37	38.8

Table 1. Summary Statistics - *Continued*

Panel C. Firm Characteristics					
	Mean	Median	Stdev	P25	P75
Total Assets ($ Billion)	31.249	4.950	105.925	2.125	12.899
Log (Market Cap $ Billion)	15.595	15.366	1.019	14.843	16.153
M/B	2.390	1.880	1.968	1.215	2.909
Stock Return in 2019	0.238	0.154	0.368	0.001	0.389
Beta	1.112	1.095	0.208	1.032	1.271
Cash/Total Assets	0.166	0.142	0.108	0.091	0.208
Idiosyn	0.144	0.119	0.100	0.093	0.153
Investment	0.046	0.032	0.045	0.013	0.065
Leverage	0.449	0.433	0.211	0.288	0.589
ROA	0.040	0.050	0.103	0.023	0.080
Sales Growth	2.312	0.143	5.054	-0.587	2.506
Log (1+Firm Age)	2.881	2.890	0.315	2.708	3.091
Net Income Growth	-0.626	0.036	3.895	-0.477	0.319
SOE	0.247	0.000	0.431	0.000	0.000
CEO Duality	0.301	0.000	0.459	0.000	1.000
Log (# of Large Block Holders)	1.331	1.386	0.658	0.693	1.792
Log (# of Small Coalitions)	3.228	3.091	1.643	1.946	4.522
Log (# of Employees)	8.196	8.050	1.493	7.169	9.092
Knowledge-based	0.176	0.000	0.381	0.000	0.000
Intangible	0.042	0.031	0.050	0.015	0.052

Panel D. Compare Firm Characteristics of Low- and High-Satisfaction Firms				
	Low Employee Satisfaction	High Employee Satisfaction	High-Low	*t*-value
# of Firms:	860	921		
Log (Market Capitalization)	15.381	15.788	0.407***	8.64
MB	2.3967	2.2357	-0.1610	-1.14
Stock Return in 2019	0.243	0.233	-0.010	0.63
Cash/Total Assets	0.159	0.173	0.014***	2.68
Beta	1.099	1.123	0.025***	2.55
Idiosyncratic Risk	0.143	0.145	0.002	0.44
Investment	0.049	0.043	-0.005***	-2.58
Leverage	0.422	0.474	0.052***	5.20
ROA	0.041	0.039	-0.003	0.53
Sales Growth	3.909	6.874	2.965***	2.89
Log (Firm Age)	2.875	2.886	0.011	0.74
Net Income Growth	-0.750	-0.513	0.237	1.28
SOE	0.240	0.253	0.012	0.61
Knowledge-based	0.142	0.207	0.064***	3.66
Intangible	0.042	0.042	0.001	0.16
Dual CEO	0.303	0.299	-0.004	0.17
Log (# Large of Block Holders)	1.261	1.392	0.131***	4.19
Log (# Small Coalitions)	2.888	3.531	0.643***	8.47
Log (# of Employees)	7.833	8.468	0.636***	4.18

Table 2. Employee Satisfaction and Stock Returns

This table examines the effect of employee satisfaction on stock returns. The dependent variable is industry-adjusted stock returns on February 3, 2020 in percentage points. We employ the sample of firms listed in mainland China ('A shares' listed in Shanghai and Shenzhen Stock Exchange) with non-missing employee satisfaction. In Panel A, Columns 1 and 2, the independent variable is *Employee Satisfaction*, the employee satisfaction score averaged across employees of a firm. The scores are submitted in 2019. In Columns 3 and 4, the independent variable of interest is *Past 3-year Employee Satisfaction*, the average employee satisfaction scores across employees who submitted score in 2016 to 2018. In Panel B, the independent variables of interest are *Employee Satisfaction* $_{High}$, a dummy indicator taking one if the firm's employee satisfaction score in 2019 is above sample median, and zero otherwise, and *Past 3-year Employee Satisfaction* $_{High}$ is an indicator taking one if the firm's past 3-year employee satisfaction is above sample median. In all specifications we control for Fama-French five factor loadings and industry fixed effects based on the CSRC industry classification (76 industries covered in our sample in total). We estimate FF5 factor loadings over past 60 months. *t*-statistics calculated from standard errors clustered by industry are reported in the parentheses. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. See Appendix B for variable definitions.

Panel A. Effect of Employee Satisfaction Score

	(1)	(2)	(3)	(4)
Employee Satisfaction	0.071***	0.078***		
	(3.809)	(3.488)		
Past 3-year Employee Satisfaction			0.062***	0.052***
			(2.577)	(2.983)
Size	0.556***	0.505**	0.571***	0.516**
	(2.928)	(2.423)	(2.933)	(2.386)
Market-to-book	0.048	0.049	0.044	0.046
	(0.987)	(0.844)	(0.902)	(0.792)
Stock Return in 2019	-0.005	0.011	-0.008	-0.003
	(-0.024)	(0.032)	(-0.033)	(-0.012)
Beta	-0.038	-1.916	-1.597	-1.886
	(-0.145)	(-0.982)	(-0.822)	(-0.992)
Idiosyncratic Risk	-1.834*	-2.353**	-1.833*	-2.241**
	(-1.835)	(-3.652)	(-1.854)	(-2.265)
Net Income Growth	0.011	-0.003	0.011	-0.004
	(0.503)	(-0.166)	(0.445)	(-0.193)
Cash Holdings	0.264	0.601	0.345	0.702
	(0.425)	(0.902)	(0.542)	(1.013)
Return-on-Assets	-3.210**	-2.717*	-3.113**	-2.636*
	(-2.125)	(-1.955)	(-2.109)	(-1.943)
State-owned	0.110	0.153	0.099	0.139
	(0.509)	(0.498)	(0.377)	(0.456)
Investment	-0.345	0.800	-0.241	1.094
	(-0.192)	(0.277)	(-0.134)	(0.354)
Leverage	0.192	0.220	0.272	0.300
	(0.255)	(0.245)	(0.378)	(0.332)
Log (Firm Age)	-0.402	-0.509	-0.396	-0.583
	(-1.077)	(-1.442)	(-1.072)	(-1.452)
Sales Growth	0.002	0.002	0.002	0.001
	(0.593)	(0.533)	(0.573)	(0.519)
Hexun CSR Score		0.003		0.003
		(0.276)		(0.325)
Log (# of Small Coalitions)		-0.175		-0.177
		(-0.812)		(-0.809)
Dual CEO		-0.458**		-0.459**
		(-2.433)		(-2.445)
Log (# of Blockholders)		-0.125**		-0.127**
		(-2.311)		(-2.398)
FF5-factor Loadings and Industry FE	Yes	Yes	Yes	Yes
R-squared (%)	9.58	9.78	9.94	9.94
Observations	1416	1328	1416	1328

Table 2. Employee Satisfaction and Stock Returns - *Continued*

Panel B. Effect of High Employee Satisfaction Score				
	(1)	(2)	(3)	(4)
Employee Satisfaction $_{High}$	0.352***	0.351***		
	(2.556)	(2.719)		
Past 3-year Employee Satisfaction $_{High}$			0.318**	0.328**
			(2.355)	(2.511)
FF5-factor Loadings	Yes	Yes	Yes	Yes
Corporate Governance Controls	No	Yes	No	Yes
Industry FE	Yes	Yes	Yes	Yes
R-squared (%)	10.94	10.23	9.93	10.14
Observations	1328	1328	1328	1328

Table 3. Employee Satisfaction and Stock Returns: Alternative Ways to Adjust Returns

This table examines the effect of employee satisfaction on stock returns. The dependent variables are returns on February 3, 2020 adjusted in various ways. In Columns 1 and 2, the dependent variable is the market-adjusted returns, i.e., we subtract the value-weighted market returns from raw returns, with the market capitalization as the weight. In Columns 3 and 4, the dependent variable is the firm characteristics-adjusted returns. We follow Daniel, Grinblatt, Titman, and Wermers (1997) to construct the measure. By the end of 2019, we sort all A share-listed firms into quintiles based on its market cap, book-to-market, and momentum (past-1-year return). In this way, we form 5×5×5 passive portfolios. We assign each stock to a passive portfolio. The excess return of a particular stock is the calculated by subtracting the value-weighted portfolios return from its raw return. In Columns 1 and 3, the independent variable is *Employee Satisfaction* $_{High}$, an indicator taking one if the firm's employee satisfaction score in 2019 is above the sample median, and zero otherwise. In Columns 2 and 4, the independent variable of interest is the *Past 3-year Employee Satisfaction* $_{High}$, an indicator taking one if the employee satisfaction scores averaged across employees of a firm who submitted a score between 2016 to 2018 is above the sample median, and zero otherwise. In all specifications we control for the FF5 factor loadings, Hexun CSR scores, and industry fixed effects based on the CSRC industry classification. *t*-statistics calculated from standard errors clustered by industry are reported in the parentheses. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. See Appendix B for variable definitions.

	Market-adjusted Return		Firm Characteristics-adjusted Return	
	(1)	(2)	(3)	(4)
Employee Satisfaction $_{High}$	0.303***		0.206**	
	(2.633)		(1.992)	
Past 3-year Employee Satisfaction $_{High}$		0.326**		0.255*
		(2.166)		(1.885)
Five-factor Loadings	Yes	Yes	Yes	Yes
CSR Score Controls	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
R-squared (%)	32.14	32.12	29.86	29.89
Observations	1328	1328	1328	1328

Table 4. Employee Satisfaction and Stock Returns: Alternative Samples

This table reports the estimation results for the impact of employee satisfaction on stock returns for alternative samples. The dependent variable is the industry-adjusted return on February 3, 2020. The independent variable is *Employee Satisfaction* $_{High}$, a dummy taking one if a firm's employee satisfaction score is above sample median. In Column 2, we exclude firms that are headquartered in the city of Wuhan from the sample. Column 3 excludes firms headquartered in Hubei province. *t*-statistics calculated from standard errors clustered by industry are reported in the parentheses. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. See Appendix B for variable definitions.

	Full Sample	Excluding Wuhan	Excluding Hubei
	(1)	(2)	(3)
Employee Satisfaction $_{High}$	0.351***	0.298**	0.275**
	(2.719)	(2.355)	(2.226)
Five-factor Loadings	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
R-squared (%)	10.23	12.10	12.17
Observations	1328	1295	1288

Table 5. How Long Does the Effect Last For? Post-event Analysis

This table reports the estimated effects of employee Satisfaction on the post-event buy-and-hold returns. We cumulate daily industry-adjusted returns from Feb 3, 2020 till 5-, 10-, 20-, and 60-trading days after. *Employee Satisfaction* $_{High}$ is a dummy indicator taking one if the employee satisfaction score is above the sample median. *t*-statistics clustered by industry are reported in the parentheses. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. See Appendix B for variable definitions.

	5-trading day	10-trading day	20-trading day	60-trading day
Variable	(1)	(2)	(3)	(4)
Employee Satisfaction $_{High}$	1.288***	1.524***	1.231**	2.513**
	(3.476)	(5.899)	(2.115)	(2.544)
FF 5-factor Loadings	Yes	Yes	Yes	Yes
CSRC Industry FE	Yes	Yes	Yes	Yes
R-squared (%)	7.30	8.24	7.72	10.26
Observations	1328	1328	1328	1328

Table 6. Long-term Effects of Employee Satisfaction

This table reports the monthly regression results of returns to a portfolio of the high employee satisfaction firms, determined by the 50th or 70th percentile in employee satisfaction score in our sample, on the Fama-French 5 factors, MKT, SMB, HML, RMW and CMA. We construct the high employee satisfaction portfolio using monthly returns from 2017 to 2020. We obtain the monthly FF5 factors from CSMAR. The dependent variable is the portfolio return less either the risk-free rate, the industry portfolio or the firm characteristics-matched portfolio return. We estimate both value-weighted and equal-weighted returns. *t*-statistics are reported in the parentheses. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. See Appendix B for variable definitions.

Panel A. High Employee Satisfaction Portfolio Determined by the 50th breakpoints

	Value-weighted			Equal-weighted		
	Risk-free	Industry	Characteristics	Risk-free	Industry	Characteristics
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Alpha	1.137***	1.498***	0.265*	0.219	1.241***	0.450
	(3.162)	(9.005)	(1.706)	(0.602)	(11.178)	(0.692)
MKT	87.076***	3.631	74.756***	70.082***	3.279	72.302***
	(10.042)	(0.914)	(6.843)	(13.546)	(1.609)	(5.833)
SMB	0.557	-0.306***	3.780	57.887***	11.041**	61.510**
	(0.032)	(-3.312)	(0.154)	(4.355)	(2.405)	(2.145)
HML	1.222	-17.153	2.686	-14.785	5.207	-7.952
	(0.053)	(-1.633)	(0.215)	(-0.972)	(0.756)	(-0.244)
RMW	1.954	47.683***	6.360	-31.287	12.375*	-28.047
	(0.082)	(4.233)	(0.215)	(-1.416)	(1.775)	(-0.809)
CMA	22.376	19.855	47.393	-33.645*	-0.281	13.876
	(0.755)	(1.435)	(1.265)	(-1.852)	(-0.045)	(0.325)
R-squared	74.69	71.81	56.39	89.94	14.17	66.28
Observations	48	48	48	48	48	48

Panel B. High Employee Satisfaction Portfolio Determined by the 70th breakpoints

	Value-weighted			Equal-weighted		
	Risk-free	Industry	Characteristics	Risk-free	Industry	Characteristics
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Alpha	1.040***	1.424***	0.430*	0.376	1.205***	0.440
	(2.845)	(6.975)	(1.992)	(0.902)	(7.892)	(0.872)
MKT	85.410***	3.721	72.346***	84.868***	6.278*	72.716***
	(9.702)	(0.762)	(6.693)	(8.462)	(1.718)	(5.983)
SMB	-15.364	-44.473***	-13.501	60.307***	-1.517	57.087**
	(-0.755)	(-3.911)	(-0.542)	(2.609)	(-0.188)	(2.033)
HML	-18.500	-21.406*	-16.207	-9.263	-7.702	-8.482
	(-0.809)	(-1.644)	(-0.57)	(-0.355)	(-0.804)	(-0.277)
RMW	-17.662	34.569**	-15.462	-35.992	9.380	-33.698
	(-0.713)	(2.606)	(-0.511)	(-1.288)	(0.911)	(-0.992)
CMA	8.794	6.295	34.194	-9.595	-4.015	13.214
	(0.296)	(0.377)	(0.922)	(-0.288)	(-0.322)	(0.315)
R-squared	76.75	65.74	59.69	80.26	13.90	67.51
Observations	48	48	48	48	48	48

Table 7. Placebo Test

This table reports the estimates of regressions that examine the impact of employee satisfaction on stock returns on non-event days. We choose two days before the outbreak of COVID-19 for the placebo test: (i) October 8, 2019; (ii) Jan 2, 2020. The dependent variables are the raw returns and industry-adjusted returns on the two dates. Firm controls are the same as we use in Table 2, Column 2. *t*-statistics calculated from standard errors clustered by industry are reported in the parentheses. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. See Appendix B for variable definitions.

Panel A. Return on Oct 8, 2019 as Dependent Variable				
	Raw Return	Industry-adjusted Return	Raw Return	Industry-adjusted Return
Variable	(1)	(2)	(3)	(4)
Employee Satisfaction $_{High}$	0.175	0.121		
	(1.191)	(0.864)		
Past 3-year Employee Satisfaction $_{High}$			0.094	0.020
			(0.674)	(0.148)
CSRC Industry FE	Yes	Yes	Yes	Yes
R-squared (%)	9.84	4.23	9.92	4.33
Observations	1084	1084	1084	1084

Panel B. Return on Jan 2, 2020 as Dependent Variable				
	Raw Return	Industry-adjusted Return	Raw Return	Industry-adjusted Return
Variable	(1)	(2)	(3)	(4)
Employee Satisfaction $_{High}$	0.094	0.020		
	(0.674)	(0.148)		
Past 3-year Employee Satisfaction $_{High}$			0.019	0.027
			(0.168)	(0.290)
CSRC Industry FE	Yes	Yes	Yes	Yes
R-squared (%)	15.33	2.71	16.23	2.89
Observations	1328	1328	1328	1328

Table 8. Employee Satisfaction, Human Capital, and Work from Home

This table reports the estimated impact of human capital on the effect of employee satisfaction. The dependent variable is industry-adjusted daily returns on February 3, 2020. In Panel A, we split the sample into high- and low-groups based on the median intangible assets-to-total assets ratio of the sample measured at the end of 2019. In Column 3, the independent variable of interest is the interaction of *Employee Satisfaction* $_{High}$ and *Intangible*. *Employee Satisfaction* $_{High}$ is a dummy taking one if the firm's employee satisfaction score in 2019 is above the sample median, and zero otherwise. *Intangible* is a dummy taking one if the firm's intangible assets-to-total assets ratio is above the sample median, and zero otherwise. In Panel B, we split the sample based on whether a firm belongs to a knowledge-based industry. In Column 3, the independent variable of interest is *Employee Satisfaction* $_{High}$ and *Knowledge-based*, a dummy indicator taking one if the firm is in knowledge-based industries. We define pharmaceutical (C27), IT and network service (I63-I65), and R&D service (M73-M75) as knowledge-based industries. *t*-statistics calculated from standard errors clustered by industry are reported in the parentheses. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. See Appendix B for variable definitions.

Panel A. By Intangible Assets

	High	Low	Full Sample
	(1)	(2)	(3)
Employee Satisfaction $_{High}$	0.588**	0.111	0.129
	(2.489)	(1.313)	(1.611)
Employee Satisfaction $_{High}$*Intangible			0.448*
			(1.675)
Intangible			-0.026
			(-0.154)
Five-factor Loadings	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
R-squared (%)	11.18	6.46	6.22
Observations	521	807	1328
Difference in Coefficients (High-Low)	0.477**		
	(2.365)		

Panel B. By Knowledge-based Industry

	Knowledge-based	Non-knowledge-based	Full Sample
	(1)	(2)	(3)
Employee Satisfaction $_{High}$	0.404**	0.214*	0.209**
	(2.445)	(1.962)	(2.054)
Employee Satisfaction $_{High}$ *Knowledge-based			0.179**
			(2.045)
Knowledge-based			1.137***
			(13.453)
Five-factor Loadings	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
R-squared (%)	10.73	7.38	6.94
Observations	322	1006	1328
Difference in Coefficients (Knowledge-based – Non-knowledge-based)	0.190		
	(0.789)		

Table 9. Employee Satisfaction and Remote Work Ability

We examine how the impact of employee satisfaction on stock returns for firms is affected by employees' remote work ability. We obtain city-level mobile payment rate, i.e., the percentage of people who use mobile payment in 2018 out of total population in a city. In Panel A, we divide the sample into high- and low-mobile payment rate group depending on whether the firm is headquartered in a city with this percentage above the sample median. In Column 3, the independent variable of interest is the interaction of *Employee Satisfaction* $_{High}$ and *High Mobile Payment Usage Rate*. *High Mobile Payment Usage Rate* is a dummy indicator taking one if the mobile payment rate in the city a firm is headquartered in is above sample median. In Panel B, we divide the sample into high and low on-line sales group based on the dollar amount of online sales per capita of the province that the firm is headquartered in. In Column 3, the independent variable of interest is the interaction of *Employee Satisfaction* $_{High}$ and *High On-line Sales*. *High On-line Sales* is a dummy indicator taking one if the on-line sales per capita of the province where a firm is headquartered is above sample median. Firm controls are the same as we use in Table 2, Column 2. *t*-statistics calculated from standard errors clustered by firm are reported in the parentheses. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. See Appendix B for variable definitions.

Panel A. By Mobile Payment Usage Rate

	High	Low	Full Sample
	(1)	(2)	(3)
Employee Satisfaction $_{High}$	0.984***	0.384	0.673**
	(2.611)	(0.552)	(2.062)
High Mobile Payment			-0.183
			(-0.462)
Employee Satisfaction $_{High}$			0.132
*High Mobile Payment			(0.288)
Five-factor Loadings	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
R-squared (%)	22.15	32.78	17.11
Observations	356	207	563
Difference in Coefficients		0.600***	
(High-Low)		(3.269)	

Panel B. By On-line Sales

	High	Low	Full Sample
	(1)	(2)	(3)
Employee Satisfaction $_{High}$	0.512**	0.470	0.959**
	(2.088)	(0.512)	(2.258)
High On-line Sales			0.018
			(0.325)
Employee Satisfaction $_{High}$			-0.378
*High On-line Sales			(-0.742)
Five-factor Loadings	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
R-squared (%)	23.62	44.08	17.11
Observations	385	178	563
Difference in Coefficients		0.042	
(High-Low)		(0.264)	

Table 10. Information Contents of Employee Satisfaction Score

This table reports the estimates of regressions that examine the impact of information contents of employee satisfaction on the firm's stock return. The dependent variable is firms' raw return or industry-adjusted return on Feb 3, 2020. In Panel A, for each firm, we divide the satisfaction scores into those given by the firm's present employees and those given by employees that have left the firm at the time they submitted the score, then take average within each group. *Employee Satisfaction* $_{High,\ Present}$ is a dummy taking one if the firm's average employee satisfaction score given by its present employees is above the sample median. *Employee Satisfaction* $_{High,\ Former}$ is a dummy taking one if a firm's average satisfaction score given by its former employees is above the sample median. In Panel B, we exclude firms with fewer than 2 or 5 comments. In Panel C, we measure the length of comments and define those with more than 5 characters as long comments. We calculate satisfaction scores with long and short comments, respectively, and then define *Employee Satisfaction* $_{High,\ Long}$ and *Employee Satisfaction* $_{High,\ Short}$ using the median of each set of scores. Firm controls are the same as we use in Table 2, Column 2. *t*-statistics calculated from standard errors clustered by industry are reported in the parentheses. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. See Appendix B for variable definitions.

Panel A. The Effect of Present vs. Former Employees

	Raw Returns		Industry-adjusted Return	
	(1)	(2)	(3)	(4)
Employee Satisfaction $_{Hieh.\ Present}$	0.383*		0.269**	
	(1.667)		(2.188)	
Employee Satisfaction $_{High,\ Former}$		0.282		0.237
		(1.115)		(1.305)
Five-factor Loadings	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
R-squared (%)	29.50	29.44	9.88	9.85
Observations	1328	1328	1328	1328
Difference in Coefficients (Present-Former)	0.101*		0.032	
	(1.847)		(0.461)	

Panel B. Delete Firms with Too Few Comments

	# Comments>=2		# Comments>=5	
	Raw Return	Industry-adjusted Return	Raw Return	Industry-adjusted Return
	(1)	(2)	(3)	(4)
Employee Satisfaction $_{High}$	0.477**	0.260**	0.594***	0.213***
	(2.852)	(2.064)	(4.435)	(2.822)
Five-factor Loadings	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
R-squared (%)	7.34	5.18	9.48	5.51
Observations	1262	1262	890	890

Panel C. Effects of Long vs. Short Comments

	Raw Return		Industry-adjusted Return	
	(1)	(2)	(3)	(4)
Employee Satisfaction $_{High,\ Long}$	0.305***		0.228***	
	(3.452)		(3.975)	
Employee Satisfaction $_{High,\ Short}$		0.353***		0.122
		(3.092)		(1.395)
Five-factor Loadings	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
R-squared (%)	6.99	7.03	5.89	5.79
Observations	1328	1328	1328	1328
Differences in Coefficients	-0.048		0.106	
	(-0.332)		(1.013)	

Table 10. Information Contents of Employee Satisfaction Score— *Continued*

Panel D. Institutional Ownership			
	High Ownership	Low Ownership	Full Sample
	(1)	(2)	(3)
Employee Satisfaction $_{High}$	0.452***	-0.128	0.260*
	(5.688)	(-1.088)	(1.944)
Employee Satisfaction $_{High}$* Institutional Ownership			0.666***
			(5.026)
Institutional Ownership			-0.349**
			(-2.277)
Five-factor Loadings	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes
Control for Firm CSR	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
R-squared (%)	12.59	19.01	6.04
Observations	667	661	1328
Difference in Coefficients (High-Low)	0.580***		
	(4.092)		

Table 11. Employee Satisfaction and Operating Performance

This table reports the estimated effect of employee satisfaction on firm operating performance. The independent variable of interest is the dummy indicator *Employee Satisfaction* $_{High}$, which takes one if the employee satisfaction score is above the sample median, and zero otherwise. Panel A uses the firm-quarter sample from 2017Q1 to 2020Q4. *Employee Satisfaction* $_{High}$ is measured as of the previous year. Panel B uses the firm-quarter sample from 2020Q2 to 2020Q4. In Panel C, the dependent variables are *changes* in operating performance measures from 2019Q4 to 2020Q3. In Panels B and C, *Employee Satisfaction* $_{High}$ is measured as of 2019. Control variables are measured as of the end of 2019Q4. *t*-statistics calculated from standard errors clustered by industry are reported in the parentheses. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. See Appendix B for detailed variable definitions.

Panel A. Employee Satisfaction and Operating Performance: 2017-2020						
	ROA	Sales Growth	Net Income Growth	Cash/AT	Leverage	Investment
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Employee Satisfaction $_{High}$	0.003***	0.018**	0.112***	0.005***	0.001	0.0004
	(4.992)	(2.437)	(2.764)	(2.578)	(0.183)	(0.933)
Log (Total Assets)	0.005***	-0.019***	0.01	-0.004	0.068***	0.001***
	(3.589)	(-4.966)	(0.690)	(-0.697)	(15.899)	(2.764)
SOE	-0.006***	-0.003	0.090***	0.027***	0.031***	-0.006**
	(-5.036)	(-0.514)	(2.690)	(3.773)	(3.177)	(-2.173)
Leverage	-0.058***	0.186***	-0.370***	-0.178***		0.002
	(-5.831)	(8.633)	(-5.643)	(-13.610)		(1.089)
Log (1+ Firm Age)	-0.014***	-0.049*	-0.128*	-0.017***	0.013	-0.011***
	(-5.328)	(-1.824)	(-1.819)	(-2.614)	(0.825)	(-6.173)
Intercept	0.047***	0.615***	0.645**	0.311***	-0.186***	0.046***
	(3.796)	(8.551)	(2.082)	(6.336)	(-3.382)	(10.281)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
CSR Score	Yes	Yes	Yes	Yes	Yes	Yes
R-squared (%)	21.43	0.53	0.47	17.56	47.39	13.24
Observations	14131	14131	14131	14009	14131	12766

Table 11. Employee Satisfaction and Operating Performance– Cont'd

Panel B. Employee Satisfaction and Operating Performance: 2020Q2-2020Q4						
	ROA	Sales Growth	Net Income Growth	Cash/AT	Leverage	Investment
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Employee Satisfaction $_{High}$	0.004***	0.027*	0.220**	0.011**	-0.025***	-0.002*
	(4.892)	(1.944)	(2.109)	(2.298)	(-4.318)	(-1.803)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
R-squared (%)	16.27	5.13	4.01	20.58	46.73	22.63
Observations	3825	5343	3825	3721	3825	3811

Panel C. Employee Satisfaction and Operating Performance: from 2019Q4 to 2020Q3						
	ΔROA	ΔSales Growth	ΔNI Growth	ΔCash/AT	ΔLeverage	Δ Investment
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Employee Satisfaction $_{High}$	0.004**	0.005	-0.197	0.007*	0.001	-0.001
	(2.011)	(0.423)	(-0.533)	(1.950)	(0.362)	(-0.081)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
R-squared (%)	45.6	54.23	79.26	24.06	3.15	6.82
Observations	1429	1429	1429	1429	1429	1429

Table 12. Employee Satisfaction and Earnings Surprise

This table reports the estimated effect of employee satisfaction on firm earnings surprises. The dependent variable is the earnings surprise measure, i.e., the difference between the average analysts' forecasted earnings per share (EPS) and the actual EPS, divided by the standard deviation of EPS forecasts. We employ the sample 2017-2020. In all specifications, the independent variable of interest is the dummy indicator *Employee Satisfaction* $_{High}$, which takes one if the employee satisfaction score is above the sample median, and zero otherwise. Control variables are measured as of the previous quarter. *t*-statistics calculated from standard errors clustered by industry are reported in the parentheses. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. See Appendix B for detailed variable definitions.

Variable	(1)	(2)	(3)	(4)
Employee Satisfaction $_{High}$	0.071***	0.070***	0.071***	0.055**
	(2.886)	(2.758)	(2.865)	(2.235)
Log (Total Assets)	-0.016	-0.026*	-0.066***	-0.031**
	(-1.167)	(-1.665)	(-4.223)	(-2.509)
Leverage	0.436***	0.433***	0.498***	0.385***
	(9.233)	(9.582)	(9.255)	(7.022)
Log (Firm Age)	0.165***	0.167***	0.165***	0.158***
	(3.252)	(3.354)	(3.235)	(3.252)
SOE	0.093***	0.088***	0.083***	0.009***
	(3.952)	(4.543)	(4.509)	(4.598)
CEO Duality			-0.033	-0.003
			(-0.382)	(-0.135)
Log (# of Large Block Holders)			0.047***	0.069***
			(3.356)	(4.062)
Log (# of Small Coalitions)			0.045***	0.011
			(3.932)	(0.982)
Hexun CSR Score				0.004***
				(5.912)
Industry FE	No	Yes	Yes	Yes
R-squared (%)	12.31	13.08	15.35	21.81
Observations	13472	13472	13472	6096

Table 13. Employee Satisfaction and Stock Returns: Alternative Explanations

This table reports the estimates of regressions that examine the impact of employee satisfaction score on stock returns for sub-samples. The dependent variable is industry-adjusted stock returns on February 3, 2020. The key independent variable is *Employee Satisfaction* $_{High}$, a dummy taking one if the employee satisfaction score is above sample median. Panel A examines the impact of employee satisfaction for state-owned and non-state-owned firms. We group firms into state-owned enterprises and non-state-owned enterprises based on the ultimate controller information in CSMAR. In Column 3, the independent variable of interest is the interaction of *Employee Satisfaction* $_{High}$ and *State-owned*, a dummy indicator taking one if the firm's ultimate controller is central State-owned Assets Supervision and Administration Commission of the State Council (SASAC), local SASAC, Ministry of Finance, or other government agents. Panel B reports the estimates of regressions that examine how the impact of employee satisfaction is affected by the firm's inside ownership. *Inside Ownership* is the percentage of shares held by a firm's management team (including the board of directors, board of supervisors, and executives) out of total shares of the firm. Column 1 employs the full sample. In Columns 2 and 3, we divide the sample into high- and low-groups based on whether the firm's inside ownership measured at the end of 2019 is above the sample median. Firm controls are the same as we use in Table 2, Column 2. *t*-statistics calculated from standard errors clustered by industry are reported in the parentheses. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. See Appendix B for detailed variable definitions.

Panel A. State-owned vs. Non-state-owned

	State-owned	Non-state-owned	Full Sample
	(1)	(2)	(3)
Employee Satisfaction $_{High}$	0.502	0.196***	0.187**
	(1.629)	(2.809)	(2.254)
State-owned			0.116
			(1.052)
Employee Satisfaction $_{High}$*State-owned			0.249
			(1.377)
Five-factor Loadings	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
R-squared (%)	11.79	5.29	6.73
Observations	431	897	1328
Difference in Coefficients		0.306	
(State-owned – Non-state-owned)		(1.422)	

Panel B. Insider Ownership

	Full Sample	High Ownership	Low Ownership	Full Sample
	(1)	(2)	(3)	(4)
Employee Satisfaction $_{High}$	0.281***	0.156*	0.463**	0.371*
	(2.677)	(1.877)	(2.385)	(1.915)
Insider Ownership	0.601***			0.888***
	(7.292)			(2.983)
Employee Satisfaction $_{High}$*				-0.581
Insider Ownership				(-0.960)
Five-factor Loadings	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Control for Firm CSR	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
R-squared (%)	6.00	5.21	10.96	6.04
Observations	1328	669	659	1328
Difference in Coefficients		-0.307		
(High-Low)		(-1.493)		