More entrepreneur innovation and less labor conflicts – empirical evidence from China employer–employee survey

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Abstract

Purpose – Labor conflict has become a serious problem in recent China. From the perspective of entrepreneur innovation, this paper aims to find an effective path to eliminate this conflict. On the basis of theoretical analyses and regression analyses, this paper finds that, with legal environment and other conditions identical, entrepreneur innovation will significantly facilitate elimination of labor conflicts.

Design/methodology/approach – Using theoretical analyses based on entrepreneurship theory, this paper puts forward a series of hypotheses about the effects of entrepreneur innovation on labor conflicts. With panel data during 2013-2015 from China Employer–Employee Survey, this paper examines the effects of entrepreneur innovation on labor conflicts. Using interaction term regressions, this paper examines heterogeneous effects of entrepreneur innovation on labor conflicts by ownership, market power and export behavior. With mediating effect model, this paper examine whether workers' participation in corporation governance is an important channel in which entrepreneurial innovation can impact on labor conflicts.

Findings – First, using benchmark regressions and robustness checks, this paper finds that there exist significantly positive effects of entrepreneur innovation on workers' job satisfaction, incentive, social security, job development and job stability, which will reduce potential risks of labor conflict effectively. Second, using interaction term regressions, this paper finds that there exist heterogeneous effects of entrepreneur innovation on labor conflicts by ownership, market power and export behaviors. The study finds that the effects of entrepreneur innovation are more concentrated in private firms, firms with stronger market power and non-exporters. Third, using a mediating effect model, the study finds that workers' participation in corporation governance is an important channel in which entrepreneur innovation can have impacts on labor conflicts.

Originality/value – The paper enriches the existing research about how to eliminate labor conflicts in China. On the basis of China Employer–Employee Survey data, this paper finds the importance of entrepreneur innovation on Chinese transition, which not only has positive impacts on firm performance, but also has impacts on eliminating labor conflicts and establishing better labor relationship. Therefore, stimulating entrepreneur innovation is very important for solving conflicts during Chinese transition.

Keywords Entrepreneurship, China employer–employee survey, Labor conflict, Workers' participation, Entrepreneur innovation

Paper type Research paper

1. Introduction

Over recent years, labor conflict has become an important issue in China. On one hand, based on mass incidents of labor conflicts reported by media (newspapers, TV and

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networks), Zhou and Wang (2015) find that there exist 279 instances of labor conflicts recorded over the last two decades. Before 2008, there were only 22 instances of labor conflicts, which amounted to 7.8 per cent of total labor conflicts within two decades. Since 2008, as a byproduct of Chinese demographic transition and labor shortage in frontline workers, labor conflicts have occurred more frequently.

On the other hand, some recent papers focus on the reasons labor conflicts have become more serious. On the basis of firm-level data set, Rickne (2014) find that wage discrimination by firm-size may be an important reason for labor conflicts in China, in which there are significantly positive relationship between firm-size and wages. Therefore, for most small and medium-sized private firms, workers' wages are discriminated. Besides that, some other papers find that, there are over 50 per cent incidents of labor conflicts caused by low wages, lack of social security, extended working hours and failure to protect important labor rights (Wen, 2016; Luthje *et al.*, 2013). On the basis of worker-level survey data, Chin and Liu (2015) find that establishing more harmonious labor relationship is important for solving rising labor conflicts in China.

However, for the lack of matched employer–employee data set, there are few papers focusing on the firm-level reasons why there exist insufficient protection of labor rights and the imbalance of interest distribution between employers and employees in China (Luthje *et al.*, 2013). Furthermore, on the basis of the statistical analyses of mass incidents of labor conflicts, significant heterogeneity is found between different firms (Luthje *et al.*, 2013; Chin and Liu, 2015). For example, labor conflicts are more biased toward firms with lower market competition, and they are more likely to occur in traditional labor-intensive sectors such as textile and garment, shoe-making and plastic products (Wang *et al.*, 2013), despite that all Chinese firms face the same legal environment. Therefore, we want to further investigate microcosmic factors, which are important for improving labor relationship and eliminating labor conflicts.

With a unique and self-collected data set (China Employer–Employee Survey Data), this paper aims to examine the effects of entrepreneur innovation on labor conflicts. In classical theoretical analyses, entrepreneurs can be characterized as lone individuals who take tremendous risk to create a new venture. They have to deal with uncertainty and ambiguity, and they have to overcome the hardship that building a venture brings about (Knight, 1921; Kihlstrom and Laffont, 1979). Therefore, entrepreneur innovation can be seen as the driving forces of society and economic development, and they are also regarded as the soul of modern enterprises (Krizner, 1973).

In empirical analyses, many recent papers discuss the effects of entrepreneur innovation on firm performance (Hamböck *et al.*, 2017; McKenzie, 2017; Pascal *et al.*, 2017; Ehrlich *et al.*, 2017; Feki and Mnif, 2016). These papers point out that entrepreneur innovation have significant impacts on firms' management model, corporation culture, their performance and even the corporation culture at firms (Lazear and Oyer, 2012; Jones, 2010; Jones and Weinberg, 2011). For example, with field-experiment data from developing countries, McKenzie (2017) finds that people with higher education can do better in making business plans and having higher growth of firm performance if they choose to open business. Besides CEO education, Acemoglu *et al.* (2014) find that there is significant correlation between CEO age and firm-level creative innovation. With other variables identical, if CEOs were younger, the firms will receive a greater number of citations per patent and have a greater fraction of their patents generated by superstar innovators.

As entrepreneur innovation is important for firms' management, innovation and performance growth, it is reasonable to infer that entrepreneur innovation may be important for eliminating labor conflicts. On the basis of analyses of economic growth theory, human

capital is an important driving force for technological innovation in the long-run (Lucas, 1988; Stokey, 1991; Acemoglu and Zilibotti, 2001; Erosa *et al.*, 2010). As firms with higher entrepreneur innovation choose to invest more on creative innovation on average (Acemoglu *et al.*, 2014; McKenzie, 2017), we can hypothesize that they will depend more on human capital, especially on stimulating the supply of effective labor efforts, which needs to decrease the potential risks of labor conflicts. However, for lack of firm-level data set matching entrepreneur innovation and labor conflicts, there are few papers focusing on this problem.

To analyze whether entrepreneur innovation is an important reason eliminating labor conflicts in China, this paper makes use of the China Employer–Employee Survey (CEES), a new longitudinal study of manufacturing firms and workers in China. We believe that this data set has several advantages. First, CEES sampled firms of various sizes across two provinces in China, building a sample, which is better able to represent patterns of Chinese industrial organization. Second, this survey not only collected information on job satisfaction, social security, incentives, job development and stability measuring potential risks of labor conflicts, but also on firm behavior related to entrepreneur innovation, such as entrepreneur innovative spirits (measured by openness to experience and extroversion based on Big Five personality model) and entrepreneur innovation capacity (such as CEO education and CEO ages). Therefore, with this data set, we can analyze the effects of entrepreneur innovation on labor conflicts robustly. Third, the CEES project further collected data about firms' ownership, market power and export behavior, which is important for examining heterogeneous effects of entrepreneur innovation on labor conflicts. Fourth, CEES also collected variables measuring workers' participation in corporation governance, which may be an important channel for entrepreneur innovation to have impacts on labor conflicts. Therefore, with CEES data, we can make plentiful descriptions and empirical analyses about the effects of entrepreneur innovation on labor conflicts.

The structure of the remainder of this paper is as follows: in Section 2, we introduce measures of labor conflicts and entrepreneur innovation in detail, and present our econometric models to analyze the effects of entrepreneur innovation on labor conflicts in China; in Section 3, we introduce the CEES data set and report our descriptive results about the variations of labor conflicts and entrepreneur innovation in recent years; in Section 4, using benchmark regressions and robustness checks, we examine effects of entrepreneur innovation on labor conflicts; in Section 5, using interaction term regressions, we examine heterogeneous effects of entrepreneur innovation on labor conflicts by ownership, market power and export behaviors; before conclusion, we use mediating effect model to examine whether workers' participation in corporation governance is an important channel for which entrepreneur innovation can have impacts on labor conflict; and Section 6 concludes.

2. Methods

In this section, we introduce measures of labor conflicts and entrepreneur innovation in detail and present our econometric models to examine hypotheses about the effects of entrepreneur innovation on labor conflicts during Chinese economic transition in response to rising labor conflicts.

2.1 Measurement

2.1.1 Labor conflicts. On the basis of existing papers researching labor conflicts (Wang and Zhou, 2016; Wen, 2016; Chin and Liu, 2015; Rickne, 2014; Lüthje, 2014; Menon and Sanyal, 2007), there are three kinds of different methods measuring labor conflicts. The first is the mass incidents of labor conflicts, such as strikes, labor disputes and other mass incidents of

labor relations that occurred in some districts during the same period (Menon and Sanyal, 2007; Lüthje, 2014), which are mainly used as proxy variables measuring district-specific labor conflicts. The second is self-evaluation indices measuring job satisfaction, workers' perception of workplace harmony and other subjective well-being used to measure happiness in the workplace, which are presented as the harmony of labor relationship or the "dark-side" of labor conflict (Chin and Liu, 2015; Piekalkiewicz, 2017; Wang and Zhou, 2016). These mean that when workers are more satisfied (or happier) they are less likely to have conflicts with their employers. The third is a series of objective indices measuring income, social welfare and labor rights protection provided for workers, such as worker compensation, incentive pay, social security spending, job development and stability and collective wage negotiation (Wen, 2016; Rickne, 2014; Söderbom *et al.*, 2005; Tan and Libby, 1997; Troske, 1999).

To examine effects of firm-level entrepreneur innovation on labor conflicts, we use the latter of two methods to measure labor conflicts between employers and employees. On one hand, we use the average of job satisfaction for each worker samples within the same firm as the main variable measuring firm-level labor conflict, which is used in benchmark regressions, interaction term regressions and mediating effects models. Specifically, in the individual-level, job satisfaction can be measured by the self-evaluated ordinal number ranging from 1-5, which represents the degree of worker samples' satisfaction about their job from lowest to highest. As CEES has randomly sampled workers in each firm by employee list enrolled at the end of previous year, the average of workers' job satisfaction can effectively represent labor conflict in the firm-level.

On the other hand, we use a series of objective indices measuring income, social welfare and labor rights provided for workers, such as incentive pay (measured by the proportion of bonus in total income), social security (measured by social security cost per worker) and job development and stability (measured by workers' promotion times in recent five years). According to existing papers about the reasons of labor conflicts in China, the lack of incentive, social security, job development and job stability may be important reasons on occurrence of labor conflicts (Zhou and Wang, 2015). Therefore, when these variables are larger, they are less likely to have labor conflicts. Similarly, we calculate the average of these variables in firm-level as alternative indices for labor conflicts, which are used in robustness check.

2.1.2 Entrepreneur innovation. On the basis of existing papers researching the effects of entrepreneur innovation on firm performance and economic growth (such as Hamböck *et al.*, 2017; McKenzie, 2017; Pascal *et al.*, 2017; Ehrlich *et al.*, 2017; Feki and Mnif, 2016), there are three kinds of different methods measuring entrepreneur innovation. The first are regional-level measures representing entrepreneur innovation in some given districts, such as the new business density (ND) by the Doing Business Project of the World Bank, and the number of patents filed by residents and non-residents (PAT) (Feki and Mnif, 2016). Although these measures can represent the variation of regional-level entrepreneur innovation effectively, there are limited in examining the effects of entrepreneurial activity on labor conflicts in the micro-level empirical analyses. Therefore, we mainly depend on the latter of two methods measuring firm-level entrepreneur innovation, which are measures of entrepreneur innovative spirits and CEO innovation capability, respectively.

On one hand, some papers find that entrepreneurial innovative spirits can have significantly positive effects on firm performance and its growth (Ahunov and Yusupov, 2017; Hamböck *et al.*, 2017; Brown *et al.*, 2011; Ahn, 2010; Macko and Tyszka, 2009; Ekelund *et al.*, 2005). These papers find that based on lottery choices and self-assessed measures about risk aversion, people having stronger risk tolerance and higher risk preference are

more likely to be self-employed or run their own business. In classical theoretical analyses, entrepreneurs can be characterized as lone individuals who take tremendous risk to create a new venture. They have to deal with uncertainty and ambiguity, and they have to overcome the hardship that building a venture brings about (Knight, 1921; Kihlstrom and Laffont, 1979). Therefore, entrepreneur innovation can be represented as entrepreneur innovative spirits, which can be measured by indices of personality traits (Zhao, 2005). With the Big Five personality model followed by McCrae and Costa (1985, 1987) and McCrae and John (1992), CEES program collected five categories of personality traits for each worker sample, which are openness to experience, extroversion, conscientiousness, agreeableness and neuroticism. Going by existing research (Stock *et al.*, 2016), openness and extroversion are two variables closely related to innovative spirits. Therefore, in this paper, we use the average of these two personality traits for each senior and middle managers[1] within the same firm as the firm-level entrepreneur innovative spirits.

On the other hand, some recent papers find that CEO innovation capability may be another important measures in analyzing the effects of entrepreneur innovation on firms' behaviors (Tåg *et al.*, 2016; Ehrlich *et al.*, 2017; Pascal *et al.*, 2017; McKenzie, 2017). For example, with 16 million observations of Swedish workers, Tåg *et al.* (2016) find that employee having more working experiences in the management (supervisors and senior staffs) are more likely to be self-employed or enter entrepreneurship, which means that management human capital may be important for entrepreneur innovation. With field-experiment data from developing countries, McKenzie (2017) find that people having higher education can do better in making business plans and having higher growth of firm performance if they choose to open business. Besides CEO education, Acemoglu *et al.* (2014) find that there is significant relationship between CEO age and firm-level creative innovation. With other variables identical, if CEO were younger, the firms will receive a greater number of citations per patent and have a greater fraction of their patents generated by superstar innovators. Furthermore, Acemoglu *et al.* (2014) find that there exists significant "within-firm" variation generated by CEO changes: when a younger CEO takes charge, innovation (new patent applications) becomes more creative. Therefore, we use CEO education and their ages respectively as proxy variables for entrepreneur innovation capability.

2.2 Hypotheses and econometric specifications

As mentioned in introduction, this paper first aims to examine whether there exist significant relationship between entrepreneur innovation and labor conflicts. If it can be supported by empirical analyses, we further examine whether there exist heterogeneous effects of entrepreneur innovation on labor conflicts by ownership, market power and export. Before conclusion, this paper aims to use mediating effect model to examine the reasons why entrepreneur innovation can effectively eliminate potential risks of labor conflicts in China.

2.2.1 The effects of entrepreneur innovation on labor conflicts. On the basis of analyses of economic growth theory, human capital is an important driving force for technological innovation in the long run (Lucas, 1988; Stokey, 1991; Acemoglu and Zilibotti, 2001; Erosa *et al.*, 2010). As firms with higher entrepreneur innovation choose to invest more on creative innovation on average (Acemoglu *et al.*, 2014; McKenzie, 2017), we can hypothesize that they will depend more on human capital, especially on stimulating the supply of effective labor efforts, which needs to decrease the potential risks of labor conflicts. Furthermore, we can infer that if firms aim to effectively eliminate labor conflicts, they will take steps to increase workers' job satisfaction (incentives and social welfare) and provide better conditions on job

development (promotion) and stability (terms of labor contracts). Therefore, we can hypothesize that entrepreneur innovation may have significantly negative effects on labor conflicts, which can be summarized as *H1-H5*:

H1. Workers' job satisfaction in firms with stronger entrepreneur innovation can be expected to be significantly higher than those with weaker entrepreneur innovation. This means that the risk of labor conflict in firms having higher entrepreneur innovation may be significantly lower.

H2. Workers' incentive pay in firms having higher entrepreneur innovation can be expected to be significantly higher than control group. If it is consistent with the empirical findings, we can infer that entrepreneur innovation can significantly decrease the potential risk of labor conflict.

H3. Workers' social welfare in firms having higher entrepreneur innovation can be expected to be significantly higher than those with lower entrepreneur innovation. If it can be supported by empirical analyses, this means that entrepreneur innovation can significantly decrease the potential risk of labor conflict.

H4. To eliminate the potential risk of labor conflict, firms with stronger entrepreneur innovation can be expected to provide more opportunities for worker's job development.

H5. In comparison with the control group, firms with stronger entrepreneur innovation can be expected to do better on job stability in decreasing labor conflict.

In empirical analysis, we use the firm-level data to estimate the effects of entrepreneur innovation on these proxy variables measuring the risk of labor conflict faced by firms. The estimation equation can be specified in (1), as follows:

$$lny_{ijdt} = \beta_0 + \beta_1 \ln E_{ijdt} + X'_{ijdt}\beta + \gamma_j + \gamma_d + \gamma_t + \varepsilon_{ijdt} \quad (1)$$

The subscripts i, j, d and t represent firms, industry, city and year, respectively. On the left hand side, lny_{ijdt} represent a series of variables measuring labor conflicts, such as job satisfaction (the average of workers' job satisfaction within the same firm), incentives (the proportion of bonus in total income per worker), social welfare (social security cost per worker), job development (average times of workers' promotion over the last five years) and job stability (the term of labor contracts), all of which are taken in logarithm. On the right hand side, lnE_{ijdt} represents a series of variables measuring entrepreneur innovation, such as entrepreneur innovative spirits (measured by the average of openness and extroversion for senior and middle managers by "Big Five" personality model) and CEO innovation capacity (measured by CEO education and ages), all of which are taken in logs. The vector X'_{ijdt} represent a series of control variables that are both correlated with labor conflicts and entrepreneur innovation, such as ownership regime, export dummy, human capital composition, output market share, firm age (in logarithm) and profit rate. The variables γ_j, γ_d and γ_t represent fixed effects of industry, city and year, respectively.

2.2.2 The heterogeneous effects of entrepreneur innovation on labor conflicts. In this subsection, we want to further examine whether there exist heterogeneous effects of entrepreneur innovation on labor conflicts by ownership, market share and export.

First, in China, entrepreneur innovation may have more significant impacts on domestic private firms than firms of other different ownership types. On one hand, as residual claim are controlled by government, top managers in state-owned enterprises (SOE) have lower

incentive to improve firm performance than other firms, especially for private firms. Therefore, the effects of entrepreneur innovation within SOEs may be relatively more limited. On the other hand, as most Hong Kong/Taiwan/Macao (HTM) invested firms and foreign (FOR) invested firms are only branches or plants, which only have limited management rights, the effects of entrepreneur innovation on firms' behaviors may be relatively lower than private ones. Based on these analyses, we can infer that effects of entrepreneur innovation on labor conflicts may be more concentrated on private firms rather than firms of other ownership types.

Second, with the existence of high firm heterogeneity in China, entrepreneur innovation may have more significant impacts in firms having stronger market power. On the basis of a micro-level UK panel data, Aghion *et al.* (2005) find that there exist significant inverse-U shaped relationship between product market competition and innovation. On one hand, for laggard firms with lower market share, competition will discourage them from innovating, in which the post-innovation rents can't offset the innovation inputs. On the other hand, for neck-to-neck firms having lower market share, competition will encourage them to depend more on innovation, in which the post-innovation rents may be higher. In the context of China, for firms having stronger market power, their technology-distances to frontier firms are smaller, which means marginal return of innovation can be expected to be higher. Therefore, based on these analyses, we can infer that effects of entrepreneur innovation on labor conflicts may be more concentrated on firms having stronger market power.

Third, entrepreneur innovation may be relatively more important for non-export firms rather than export firms in China. Some recent papers find that unlike exceptional performers of exporters in most countries, export firms in China are less productive than non-export ones, mainly because of the high proportion of processing trade and large amounts of export subsidies; Dai *et al.*, 2016). Furthermore, with CEES data that randomly sampled firms based on firm list of third economic census in 2014, we also find that there exist 39.4 per cent firms engaged in processing trade among export firm samples. Therefore, based on these analyses, we can infer that effects of entrepreneur innovation on labor conflicts may be more concentrated on non-export firms.

In summary, we can provide inferences about heterogeneous effects of entrepreneur innovation on labor conflicts in *H6-H8*:

H6. In China, the effects of entrepreneur innovation may be concentrated on private firms. In specific, in comparison with firms of other ownership types, entrepreneur innovation can be expected to have more significant impacts in eliminating labor conflicts in private firms.

H7. In China, the effects of entrepreneur innovation may be concentrated on firms having higher market share. Specifically, entrepreneur innovation can be expected to have more significant impacts in eliminating labor conflicts in firms having lower market share.

H8. In China, the effects of entrepreneur innovation may be concentrated on non-export firms. Specifically, entrepreneur innovation can be expected to have more significant impacts in eliminating labor conflicts in non-export firms.

In empirical analysis, we use interaction term regressions to estimate the effects of entrepreneur innovation on labor conflicts faced by firms. For simplicity, we only use the average of workers' job satisfaction (in logarithm) as dependent variables (lny_{ijdt}). The estimation equation will be specified in (2), as follows:

$$lny_{ijdt} = \alpha_0 + \alpha_1 \mathrm{E_{ijdt}} + \alpha_2 \mathrm{M_{ijdt}} + \alpha_3 \mathrm{E_{ijdt}} \times \mathrm{M}_{ijdt} + X'_{ijdt}\alpha + \gamma_j + \gamma_d + \gamma_t + \varepsilon_{ijdt} \quad (2)$$

On the right hand side, E_{ijdt} is a 0-1 dummy representing whether the firm belongs to the subgroup with stronger entrepreneur innovation (measured by whether the average of openness personality traits in senior and middle managers is equal or higher than the median). M_{ijdt} represents a series of 0-1 dummy variables measuring classifications of firms by ownership (measured by whether the firm is private), market power (measured by whether the firm's output market share is equal or higher than 11 per cent) and export (measured by whether the firm is exporter) respectively. The coefficients of interaction term $\mathrm{E}_{ijdt} \times \mathrm{M}_{ijdt}$ (α_3) represents the heterogeneous effects of entrepreneur innovation on labor conflicts. On the basis of *H6-H8*, we can expect that estimation coefficients of interaction term between entrepreneur innovation and private firms (market power) are significantly positive, and the estimation coefficients of interaction term between entrepreneur innovation and export dummy are expected to be significantly negative.

2.2.3 The mediating effects model. In this subsection, we want to analyze the reason entrepreneur innovation can have significant impacts in eliminating labor conflicts. On the basis of theoretical analyses mentioned in introduction, workers' participation in corporation governance may be an important channel for which entrepreneur innovation may eliminate labor conflicts. With existing research about labor conflicts (Wen, 2016; Lüthje, 2014), the imbalance of interest distribution between employer and employee is an important problem concerning the existence of labor conflict. On the basis of these discussions, as lack of sufficient workers' participation on management, the collective negotiation about interest distribution can't be established really in Chinese firms, which is difficult to make the increment of workers' labor rights consistent with firms' development. Therefore, the low degree of workers' participation in management may result in rising potential risks of labor conflict in China.

In this paper, we aim to examine whether workers' participation in management is an important mediating channel in which entrepreneur innovation can have impacts in eliminating labor conflicts. We can infer that for firms having higher entrepreneur innovation, they will depend more on human capital to performance growth, which needs to decrease the potential risks of labor conflicts. Therefore, in comparison with control group, these firms with higher entrepreneur innovation may permit more workers' participation in corporation governance, which will help in establishment of collective negotiation of interest distribution between employers and employees. These means that workers' participation in corporation governance may be an important mediating channel in which entrepreneur innovation eliminates labor conflict. The discussions can be summarized in *H9*:

H9. Workers' participation in corporation governance (WPCG) is an important mediating channel for which entrepreneur innovation eliminates labor conflicts. These mean that, on one hand, firms with higher entrepreneur innovation are more likely to allow workers to participate in corporation governance. On the other hand, workers' participation in corporation governance can effectively partially explain why entrepreneur innovation can eliminate labor conflicts.

In empirical analyses, we use mediating effects model to examine whether *H9* are consistent with micro-level empirical evidence. We introduce a two-step estimation equation to analyze this problem. In the first step, we use a 0-1 dummy variable (whether firms allow their workers to participate in corporation governance) as dependent variable, estimating the

marginal effect of entrepreneur innovation (E_{ijdt}) on WPCG at means by logit regressions. The estimation equation of the first step is specified as (3). In the second step, we add the variable $WPCG_{ijdt}$ into the right-hand side of equation (1), examining whether this variable can effectively explain the effects of entrepreneur innovation in part. The estimation equation of the second step is specified as (4):

$$WPCG_{ijdt} = \lambda_{A0} + \lambda_{A1} E_{ijdt} + X'_{ijdt} \lambda_A + \gamma_j + \gamma_d + \gamma_t + \varepsilon_{ijdt} \quad (3)$$

$$lny_{ijdt} = \lambda_{B0} + \lambda_{B1} E_{ijdt} + \lambda_{B2} WPCG_{ijdt} + X'_{ijdt} \lambda_B + \gamma_j + \gamma_d + \gamma_t + \varepsilon_{ijdt} \quad (4)$$

3. Data descriptions

3.1 CEES data

To examine the effects of entrepreneur innovation on labor conflicts, this paper uses from CEES, which is a new longitudinal study on manufacturing firms and workers in China. The CEES was initiated in 2014 by Hong Cheng at Wuhan University, Yang Du at the Chinese Academy of Social Sciences, Hongbin Li at Stanford University (originally Tsinghua University) and Albert Park at the Hong Kong University of Science and Technology. The four founders are also principal investigators (PIs) of the CEES project. The project is administered by the China Enterprise Survey and Data Center (CESC)[2] at Wuhan University headed by Hong Cheng and Hongbin Li.

The lists of firms from the third National Economic Census were used as the sampling frame for the survey. With the probability proportionate-to-size (PPS) sampling, CEES randomly sampled 1,122 firms (585 in Hubei Province and 587 firms in Guangdong Province) in 2016, covering 26 prefecture cities. Therefore, different from existing Chinese firm-level data set used in papers, CEES can effectively represent the real statistical distributions of Chinese firms. Besides employers, employees were also randomly selected with stratification. To do so, we first asked firms to provide a list of all employees enrolled at the end of the previous year, with middle and senior managers listed separately. We then randomly selected ten employees in each firm (six to nine for smaller firms), among which three (two for smaller firms) were middle and senior managers. With this method, CEES randomly sampled 9,103 worker samples (4,114 in Hubei Province and 4,989 in Guangdong Province) in 2016. Different from existing Chinese worker-level survey data used in papers, CEES collect more worker samples that are employed in middle and small firms in China.

It is noteworthy that the firm and worker questionnaires were designed by four PIs together with a team of over 30 researchers. The 2016 firm questionnaire includes seven modules and 1,030 variables, covering the basic situation of firms (including firm accounting data), firm head characteristics, management, production, sales, innovation, quality control and human capital. The employee questionnaire includes five modules and 443 variables, covering personal background, current job, work history, social insurance and personality traits. Therefore, based on this data, this paper can effectively measure entrepreneur innovation (including both entrepreneur innovative spirits and CEO innovation capacity), labor conflicts (job satisfaction, incentive, social security costs, job development and stability) and workers' participation in management, which are important for examining the effects of entrepreneur innovation on labor conflicts.

3.2 Statistical analyses

A summary of firm-level measures of job satisfaction is reported in Table I. From the information presented in this table, based on CEES data, we find that the average job satisfaction between 2013 and 2015 was 3.53, which is a little higher than the moderate level in China. This means that the degree of workers' job satisfaction doesn't increase consistently with the economic growth, which results in the increment of potential risks of labor conflicts. Furthermore, results in Table I show that there perhaps exists significant heterogeneity of job satisfaction in Chinese firms. For example, for firms in the subgroup of bottom 20 per cent of job satisfaction, the average is 2.98, which is 27.5 per cent lower than those in the subgroup of top 20 per cent.

Statistical results in Table II show that there is significant statistical correlation between entrepreneur innovation and labor conflicts. For example, for firms in Guangdong province having higher regional entrepreneur innovation, the average of incentive pay (social security cost per worker) is 6.10 per cent point (6.82 thousand RMB), which is 8.3 per cent (1.0 per cent) higher than those in Hubei province. Similarly, for firms in Guangdong province, the average of employees' promotion times (terms of labor contract) is 0.65 (2.13 years),

Table I.
Statistics of job satisfaction in CEES (2013-2015 Panel)

Classification	Job satisfaction (the average in firm-level, 1-5 score) Mean	Obs.
All firms	3.53	3,234
Firms in Guangdong	3.49	1,614
Firms in Hubei	3.56	1,551
Firms in the bottom 20%	2.98	6,81
Firms in the top 20%	4.11	6,39

Notes: Statistical analyses based on the China Employer–Employee Survey (CEES) data. Job satisfaction is measured as the average of self-evaluated 1-5 scoring index (from the lowest to the highest) about degree of satisfaction for each workers within the same firm

Table II.
Statistics of other indices measuring labor conflict in CEES (2013-2015 Panel)

Classification	All firms Mean	All firms Obs.	Firms in Guangdong Mean	Firms in Guangdong Obs.	Firms in Hubei Mean	Firms in Hubei Obs.	Firms in the bottom 20% Mean	Firms in the bottom 20% Obs.	Firms in the top 20% Mean	Firms in the top 20% Obs.
Incentive pay (% points)	5.87	1,753	6.10	883	5.63	870	0.01	351	15.40	348
Social security cost per worker (thousand RMB)	6.79	2,103	6.82	924	6.76	1,179	0.44	421	19.1	420
The average of employees' promotion times	0.60	3,483	0.65	1,842	0.55	1,551	0.06	702	1.45	531
Term of labor contract (years)	2.02	3,052	2.13	1,555	1.91	1,497	0.95	1,441	4.89	162

Notes: Statistical analyses based on the China Employer-Employee Survey (CEES) data. Incentive pay is measured as the ratio of bonuses to wages weighted by the number of employees in different operating posts. Social security cost per worker is measured as the average costs provided by firm to each worker for social welfare and insurance. For promotion times, it is measured as the average of employees' promotion times within recent five years in each firm. For term of labor contract, it is measured as the average period of labor contract between employer and employee

which is 18.2 per cent (11.5 per cent) higher than those in Hubei province. All of these statistical analyze show that when the entrepreneur innovation is higher, the incentive, social insurance, job development and stability are significantly better, which mean the potential risks of labor conflict are lower.

Results in Table III find that there exists significant heterogeneity of entrepreneur innovation in CEES data. In comparison with the control group (firms of bottom 20 per cent entrepreneur innovation[3]), the measures of entrepreneur innovative spirits and innovation capacity are significantly higher in firms of top 20 per cent. For example, for firms of top 20 per cent, the averages of entrepreneur innovation capacity (CEO education and CEO ages) are 11.0 and 69.8 years, which are 77.3 per cent and 70.1 per cent higher than control group. Similarly, for firms of top 20 per cent, the averages of entrepreneur innovative spirits (openness and extroversion of personality traits) are 3.41 and 3.43, respectively, which are 19.2 per cent and 16.7 per cent higher than the control group.

Before entering into regression analyses, we present the statistics of control variables by entrepreneur innovation in Table IV. These results show that there exist significant statistical difference of control variables between firms with higher entrepreneur innovation and those with lower entrepreneur innovation. For example, for firms where senior and middle managers owns lower openness of personality traits by the human capital composition (measured by the proportion of workers obtain degree of high school or junior college) is 31.3 per cent points, which is 21.2 per cent lower than firms with higher openness of personality traits. By stark contrast, for firms having lower openness of personality traits, they are more likely to have weaker market competition, in which the proportion of firms having output market share of 1 per cent and below (23.8 per cent points) is 39.2 per cent higher than those with higher entrepreneur innovative spirits. These results mean that to estimate the effects of entrepreneur innovation on labor conflicts robustly, it is important to control these variables, which are correlated both dependent and independent variables in regressions.

	All firms		Firms in Guangdong		Firms in Hubei		Firms in the bottom 20%		Firms in the top 20%	
Classification	Mean	Obs.	Mean	Obs.	Mean	Obs.	Mean	Obs.	Mean	Obs.
The average of openness in personality traits by senior and middle managers	3.14	3,483	3.14	1,842	3.13	1,551	2.86	801	3.41	654
The average of extroversion in personality traits by senior and middle managers	3.19	3,483	3.19	1,842	3.19	1,551	2.94	711	3.43	690
CEO education (years)	14.3	3,169	14.6	1,528	14.0	1,641	11.0	1,209	19.5	365
CEO age (years)	48.6	3,072	49.8	1,458	47.6	1,614	36.1	631	61.4	582

Notes: Statistical analyses based on the China Employer–Employee Survey (CEES) data. Openness in personality traits is measured as the average of openness in "Big Five" personality traits tests for every junior and middle manager randomly sampled within the same firm. Extroversion in personality traits is measured as the average of extroversion in "Big Five" personality traits tests for every junior and middle manager randomly sampled within the same firm. The other two variables measuring entrepreneur innovation are CEO's schooling years and their ages

Table III. Statistics of entrepreneur innovation in CEES (2013-2015 Panel)

Classification	Firms with higher openness of personality traits by senior and middle managers Mean	Obs.	Firms with lower openness of personality traits by senior and middle managers Mean	Obs.
1. Ownership				
The proportion of domestic private enterprises (% points)	60.4	1,620	62.3	1,575
Hong Kong/Macao/Taiwan invested firms (per cent points)	16.4	1,620	21.1	1,575
Foreign invested firms	8.5	1,620	6.9	1,575
2. Human capital				
The proportion of workers graduated from high school or junior college (% points)	39.7	1,531	31.3	1,458
The proportion of workers graduated from college or above (% points)	8.2	1,531	5.2	1,458
3. Market power				
The proportion of firms having export (% points)	45.9	1,545	40.6	1,521
The proportion of firms having output market share of 1% and below (% points)	17.1	1,488	23.8	1,476
The proportion of firms having output market share of 1-10% (% points)	31.9	1,488	31.7	1,476
The proportion of firms having output market share of 11-50% (% points)	30.2	1,488	23.8	1,476
The proportion of firms having output market share of 51% and above (% points)	20.8	1,488	20.7	1,476
4. Firm performance and age				
Firm age (years)	11.8	1,702	11.2	1,662
Profit rate (% points)	4.8	1,557	4.4	1,539

Table IV. Statistics of other variables by entrepreneur innovation in CEES (2013-2015 Panel)

Notes: Statistical analyses based on the China Employer–Employee Survey (CEES) data. On the basis of whether firms have openness of personality traits in senior and middle managers equal to and above (below) the median, we can classify firms into two subgroups: one is firms having higher entrepreneur innovation, and the other is firms having lower entrepreneur innovation

4. Regression analyses

4.1 Benchmark regressions

In this subsection, we aim to examine the effects of entrepreneur innovation on labor conflicts, which correspond to *H1*. The estimation equation is (1), mentioned above.

On one hand, regressions results in Table V show that, entrepreneur innovative spirits have significant effects in eliminating potential risks of labor conflicts. We find that, when control variables and fixed effects of industry, districts and year are fully added into the right hand-side of regression model, the estimation coefficients about the elasticity of entrepreneur innovative spirits on workers' job satisfaction are significantly positive at least 5 per cent level (column 3 and 6 in Table V). For example, with other factors identical, when the average of openness personality traits increases by 10 per cent, the workers' job satisfaction will increase 1.3 per cent on average. Similarly, with other factors fully controlled, when the average of extroversion personality traits increase by 10 per cent, the workers' job satisfaction will increase by

Table V. The effects of entrepreneur innovative spirits on job satisfaction (2013-2015 Panel)

Classification	Dependent variable: job satisfaction (the firm-level average in logs) (1)	(2)	(3)	(4)	(5)	(6)
The average openness of personality traits by managers (in logs)	0.128** (2.389)	0.133** (2.457)	0.132** (2.435)			
The average extroversion of personality traits by managers (in logs)				0.244*** (5.050)	0.238*** (4.939)	0.236*** (4.906)
Domestic private firms (0-1 dummy)		0.0266*** (3.672)	0.0247*** (3.349)		0.0271*** (3.730)	0.0256*** (3.442)
Hong Kong, Taiwan and Macao invested firms (0-1 dummy)		0.0210** (2.452)	0.0200** (2.337)		0.0212** (2.472)	0.0203** (2.374)
Other foreign-invested firms (0-1 dummy)		0.00890 (0.883)	0.00792 (0.783)		0.00767 (0.760)	0.00690 (0.681)
The workers' proportion of high school and junior college		−0.000283 (−0.033)	−0.000584 (−0.068)		0.00227 (0.258)	0.00198 (0.227)
The workers' proportion of college and above		−0.0269 (−1.538)	−0.0246 (−1.391)		−0.0177 (−1.062)	−0.0156 (−0.924)
Export dummy (0-1 dummy)		−0.00839 (−1.602)	−0.00776 (−1.485)		−0.00722 (−1.379)	−0.00666 (−1.272)
Market share (1-10%)		−0.00479 (−0.570)	−0.00455 (−0.550)		−0.00312 (−0.374)	−0.00290 (−0.353)
Market share (11-50%)		0.0167* (1.848)	0.0170* (1.920)		0.0180** (2.025)	0.0183** (2.099)
Market share (51-100%)		0.00871 (0.921)	0.00898 (0.960)		0.00832 (0.889)	0.00860 (0.930)
Firm age (in logs)			−0.00461 (−1.216)			−0.00409 (−1.061)
Profit rate			−0.00598 (−0.175)			−0.00839 (−0.246)
Industry fixed effects	yes	yes	yes	yes	yes	yes
City fixed effects	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Observations	2,520	2,520	2,520	2,520	2,520	2,520
R-squared	0.103	0.115	0.115	0.110	0.120	0.121

Notes: Numbers in parentheses are t statistics with robust standard errors. *, ** and ***represent the significance at 10, 5 and 1 % levels, respectively

2.4 per cent on average. These mean that, when firms own higher entrepreneur innovative spirits, they will take more steps to increase workers' job satisfaction, which will eliminate potential risks of labor conflicts.

On the other hand, regressions results in Table VI show that entrepreneur innovation capacity also have significant effects in eliminating potential risks of labor conflicts. We find that when control variables and fixed effects of industry, districts and year are fully added into the right hand-side of regression model, the estimation coefficients about the elasticity of entrepreneur innovation capacity on workers' job satisfaction are statistically significant at least 10 per cent level (Columns 3 and 6 in Table VI). For example, with other factors identical, when the schooling years of CEOs double, the workers' job satisfaction will increase by 7.3 per cent point. Similarly, with other factors fully controlled, when the average of CEO age reduces by 50 per cent, the workers' job satisfaction will increase by 2.6 per cent point. These mean that when firms own entrepreneur innovation capacity (more CEO education and younger CEO), they will take more steps to increase workers' job satisfaction, which will eliminate potential risks of labor conflicts.

In summary, regression results in Tables V and VI show that for firms with stronger entrepreneur innovative spirits and stronger entrepreneur innovation capacity, they are more likely to take steps to increase workers' job satisfaction. Therefore, entrepreneur innovation indeed has significant impacts in eliminating labor conflicts. Our findings are consistent with *H1*.

4.2 Robustness checks

In this subsection, we aim to use more variables measuring labor conflicts as dependent variables and regress them on entrepreneur innovation robustly. In robustness checks, we want to further examine whether entrepreneur innovation has significant effects in eliminating the potential risks of labor conflicts. These results are consistent with *H2-H5*. The estimation equation is (1) mentioned above.

On one hand, regression results in Table VII show that entrepreneur innovation have significant effects in increasing incentives and social security expenditures provided for workers, which will effectively decrease potential risks of labor conflicts. We find that when control variables and fixed effects of industry, districts and year are fully added into the right hand-side of regression models, the estimation coefficients about the elasticity of entrepreneur innovation on incentive and social security expenditure are significantly positive at least 10 per cent level (Columns 2 and 4 in Table VII). For example, with other factors identical, when the average of openness personality traits increase by 1 per cent, the incentive pay provided for workers will increase by 1.1 per cent on average. Similarly, with other factors fully controlled, when the average of openness personality traits increase by 10 per cent, the average social security expenditure provided for workers will increase by 2.2 per cent. These indicate that when firms own higher entrepreneur innovation, they will do better in increasing workers' incentives and social welfare, which help in eliminating potential risks of labor conflicts.

On the other hand, regression results in Table VIII show that, entrepreneur innovation has significant effects in increasing workers' job development and stability. We find that when control variables and fixed effects of industry, districts and year are fully added into the right hand-side of regression model, the estimation coefficients about the elasticity of entrepreneur innovation on job development and stability are statistically significant at least 10 per cent level (Columns 2 and 4 in Table VIII). For example, with other factors identical, when the average of openness personality traits increase by 10 per cent, the average of employees'

Table VI. The effects of entrepreneur innovative capacity on job satisfaction (2013-2015 Panel)

Classification	Dependent variable: job satisfaction (the firm-level average in logs) (1)	(2)	(3)	(4)	(5)	(6)
CEO education (in logs)	0.0581 (1.408)	0.0730* (1.693)	0.0729* (1.690)			
CEO age (in logs)				−0.0326** (−2.523)	−0.0276** (−2.127)	−0.0255** (−1.986)
Domestic private firms (0-1 dummy)		0.0319*** (4.344)	0.0303*** (4.234)		0.0265*** (3.639)	0.0241*** (3.231)
Hong Kong, Taiwan and Macao invested firms (0-1 dummy)		0.0175** (2.020)	0.0166* (1.906)		0.0228*** (2.594)	0.0214** (2.440)
Other Foreign-invested firms (0-1 dummy)		0.00118 (0.099)	0.000403 (0.033)		0.0135 (1.261)	0.0123 (1.141)
The workers' proportion of high school and junior college		0.00111 (0.137)	0.000810 (0.100)		0.00718 (0.786)	0.00685 (0.754)
The workers' proportion of college and above		−0.0344* (−1.766)	−0.0318 (−1.596)		−0.0189 (−1.062)	−0.0154 (−0.855)
Export dummy (0-1 dummy)		−0.00815 (−1.480)	−0.00746 (−1.353)		−0.00880 (−1.616)	−0.00793 (−1.457)
Market share (1-10%)		−0.0113 (−1.578)	−0.0110 (−1.550)		−0.00498 (−0.565)	−0.00446 (−0.515)
Market share (11-50%)		0.0123* (1.664)	0.0128* (1.727)		0.0200** (2.142)	0.0208** (2.270)
Market share (51-100%)		0.00479 (0.573)	0.00518 (0.625)		0.00852 (0.861)	0.00911 (0.934)
Firm age (in logs)			−0.00457 (−1.160)			−0.00656 (−1.644)
Profit rate			−0.0128 (−0.371)			−0.0184 (−0.519)
Industry fixed effects	yes	yes	yes	yes	yes	yes
City fixed effects	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Observations	2,457	2,457	2,457	2,390	2,390	2,390
R-squared	0.111	0.128	0.128	0.104	0.115	0.116

Notes: The numbers in parentheses are t statistics with robust standard errors. *, ** and ***represent the significance at 10, 5 and 1 % levels, respectively

promotion times in recent five years will increase by 7.0 per cent and the terms of labor contracts will also increase by 2.0 per cent. These mean that, when firms own higher entrepreneur innovation, they will provide better opportunities of job development and stability for workers, which help in eliminating potential risks of labor conflicts.

In summary, regression results in Tables VII and VIII show that for firms having higher entrepreneur innovation, they robustly do better in increasing incentives and social welfare for workers and they are more likely to provide better opportunities of job development and stability for workers. Therefore, in robustness checks, we further find that entrepreneur innovation indeed has significant impacts in eliminating labor conflicts, which are consistent with *H2-H5*.

5. Further discussions

5.1 Interaction term regressions

In this subsection, we aim to examine heterogeneous effects of entrepreneur innovation on labor conflicts by ownership, market power and export behaviors. These results are consistent with *H6-H8*. The estimation equation is (2), mentioned above.

Table VII.
The effects of entrepreneur innovative spirit on incentive and social security (2013-2015 Panel)

Classification	Incentive pay (per cent points, in logs) (1)	(2)	Social security cost per worker (in logs) (3)	(4)
The average openness of personality traits by managers (in logs)	1.860*** (4.521)	1.121*** (2.695)	0.431*** (3.514)	0.223* (1.851)
Other controls	no	yes	no	yes
Industry fixed effects	yes	yes	yes	yes
City fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
Observations	1,463	1,463	1,726	1,726
R-squared	0.118	0.211	0.173	0.290

Notes: Numbers in parentheses are *t* statistics with robust standard errors. * and ***represent the significance at 10 and 1% levels, respectively

Table VIII.
The effects of entrepreneur innovative spirit on promotion and job stability (2013-2015 Panel)

Classification	The average of employees' promotion times (in logs) (1)	(2)	Term of labor contract (years, in logs) (3)	(4)
The average openness of personality traits by managers (in logs)	0.814*** (8.404)	0.703*** (7.752)	0.330*** (2.653)	0.203* (1.702)
Other controls	no	yes	no	yes
Industry fixed effects	yes	yes	yes	yes
City fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
Observations	2,528	2,528	2,388	2,388
R-squared	0.162	0.264	0.113	0.188

Notes: Numbers in parentheses are *t* statistics with robust standard errors. * and ***represent the significance at 10 and 1% levels, respectively

First, regressions results in Table IX show that the effects of entrepreneur innovation on labor conflicts are more concentrated on private firms. In comparison with firms having lower entrepreneur innovative spirits (measured by openness personality traits), the average of workers' job satisfaction in firms with higher entrepreneur innovation is 1.2 per cent higher, which support the hypotheses that entrepreneur innovation can effectively eliminate potential risks of labor conflicts (Column 3 in Table IX). Furthermore, when we add the interaction term of entrepreneur innovation and private dummy into regressions, we find that the estimation coefficients of the 0-1 dummy variable whether firms belong to the subgroup of higher entrepreneur innovation become insignificant, while the estimation coefficients of interaction term $E_{ijdt} \times M_{ijdt}$ is significantly positive at 10 per cent level at least. These results mean that the effects of entrepreneur innovation are more concentrated in private firms, which supports the inference of *H6*.

Second, regressions in Table X show that the effects of entrepreneur innovation on labor conflicts are more concentrated in firms with stronger market power. In comparison with firms having lower entrepreneur innovative spirits (measured by openness personality traits), the average of workers' job satisfaction in firms with higher entrepreneur innovation is 1.2 per cent higher, which also support the hypotheses that entrepreneur innovation can effectively eliminate potential risks of labor conflicts (Column 3 in Table X). Furthermore, when we add the interaction term between entrepreneur innovation and market power (measured by whether firms have output market share higher than 10 per cent), regression results show that the estimation coefficients of the 0-1 binary variable E_{ijdt} become insignificant, while the estimation coefficients of interaction term $E_{ijdt} \times M_{ijdt}$ is significantly positive at least 1 per cent level. These results mean that the effects of entrepreneur innovation are more concentrated in firms with stronger market power, whose technology-distance to global frontier is closer. These finding are consistent with *H7*.

Table IX. Effects of entrepreneur innovation and ownership on job satisfaction (2013-2015 Panel)

Classification	Dependent variable: job satisfaction (the firm-level average in logs) (1)	(2)	(3)	(4)
Whether having higher openness or not (0-1 dummy)	0.0112** (2.291)	0.0116** (2.444)	0.0120** (2.485)	0.00192 (0.286)
Private firms × higher openness				0.0161* (1.676)
Domestic private firms (0-1 dummy)			0.0251*** (3.432)	0.0157* (1.658)
Hong Kong, Taiwan and Macao invested firms (0-1 dummy)			0.0216** (2.527)	0.0197** (2.277)
Other foreign-invested firms (0-1 dummy)			0.00865 (0.863)	0.00846 (0.842)
Other controls	no	yes	yes	yes
Industry fixed effects	yes	yes	yes	yes
City fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
Observations	2,520	2,520	2,520	2,520
R-squared	0.101	0.109	0.113	0.114

Notes: Numbers in parentheses are *t* statistics with robust standard errors. *, ** and ***represent the significance at 10, 5 and 1 % levels, respectively

Third, regressions in Table XI show that the effects of entrepreneur innovation on labor conflicts are more concentrated in non-export firms. In comparison with firms with lower entrepreneur innovative spirits (measured by openness personality traits), the average of workers' job satisfaction in firms with higher entrepreneur innovation is 1.2 per cent higher, which is consistent with hypotheses that entrepreneur innovation can effectively eliminate potential risks of labor conflicts (Column 3 in Table XI). However, when add the interaction term between entrepreneur innovation and export behavior (measured by whether firms are exporters or not), regression results show that the estimation coefficients of the 0-1 binary variable E_{ijdt} become significantly higher, while the estimation coefficients of interaction term $E_{ijdt} \times M_{ijdt}$ is significantly negative at 5 per cent level at least. These results mean that the effects of entrepreneur innovation on labor conflicts are much weaker in non-export firms. These findings are consistent with *H8*.

Table X. Effects of entrepreneur innovation and market share on job satisfaction (2013-2015 Panel)

	Dependent variable: job satisfaction (the firm-level average in logs)			
Classification	(1)	(2)	(3)	(4)
Whether having higher openness or not (0-1 dummy)	0.0112** (2.291)	0.0124** (2.562)	0.0124** (2.562)	0.00593 (1.049)
Market share(>11%) × higher openness				0.0299*** (2.674)
Market share (>11%)			0.00501 (0.879)	−0.0105 (−1.198)
Other controls	no	yes	yes	yes
Industry fixed effects	yes	yes	yes	yes
City fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
Observations	2,520	2,520	2,520	2,520
R-squared	0.101	0.108	0.108	0.110

Notes: Numbers in parentheses are *t* statistics with robust standard errors. ** and ***represent the significance at 5 and 1% levels, respectively

Table XI. Effects of entrepreneur innovation and export on job satisfaction (2013-2015 Panel)

	Dependent variable: job satisfaction (the firm-level average in logs)			
Classification	(1)	(2)	(3)	(4)
Whether having higher openness or not (0-1 dummy)	0.0112** (2.291)	0.0116** (2.405)	0.0120** (2.485)	0.0219*** (3.173)
Export×higher openness				−0.0224** (−2.459)
Export dummy (0-1 dummy)			−0.00756 (−1.430)	0.00474 (0.694)
Other controls	no	yes	yes	yes
Industry fixed effects	yes	yes	yes	yes
City fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
Observations	2,520	2,520	2,520	2,520
R-squared	0.101	0.112	0.113	0.115

Notes: Numbers in parentheses are *t* statistics with robust standard errors. ** and ***represent the significance at 5 and 1% levels, respectively

5.2 Reason analyses

In this subsection, we aim to examine the reason why entrepreneur innovation can have significant effects on labor conflicts. According the theoretical analyses mentioned in Section 2, we can infer that workers' participation in corporation governance ($WPCG_{ijdt}$) may be an important mediating channel, in which entrepreneur innovation can have impacts in eliminating labor conflicts. To examine this inference, we estimate a mediating effect model specified in estimation equations (3) and (4), which correspond to *H9*.

First, regression results in Table XII show that entrepreneur innovative spirits have significantly positive effects in workers' participation in corporation governance ($WPCG_{ijdt}$). Results in logit regressions show that, in comparison with firms having lower entrepreneur innovative spirits, the marginal probability of choosing workers to participate in corporation governance is 5.4 per cent higher in firms with higher entrepreneur innovative spirits (Column 2 in Table XII). Furthermore, regression results in linear model find that, the coefficients of independent variable E_{ijdt} are robustly positive at least 5 per cent level (Columns 3 and 4 in Table XII).

Second, regressions in Table XIII show that entrepreneur innovation capacity also has significantly positive effects in workers' participation in corporation governance ($WPCG_{ijdt}$). Results in logit regressions show that, in comparison with firms having lower entrepreneur innovation capacity (measured by lower CEO education), the marginal probability of choosing workers to participate in corporation governance is 6.7 per cent larger in firms with higher CEO education (Column 2 in Table XIII). Besides non-linear models, regression results in linear OLS models further find that, the coefficients of entrepreneur innovation capacity are robustly positive at least 1 per cent level (Columns 3 and 4 in Table XIII).

Third, regressions in Table XIV show that, when adding the 0-1 binary variable $WPCG_{ijdt}$ into the right hand-side regression (estimation equation (4), mentioned above), it can effectively explain the reason why entrepreneur innovation can eliminate labor conflicts. We can find that in comparison with regressions without the variable $WPCG_{ijdt}$, the estimation coefficients of entrepreneur innovative spirits (CEO education) will be reduced by 21.1 per cent (29.4 per cent), respectively, although they are still significantly positive at least 1 per cent level. These mean that workers' participation in corporation governance can effectively explain the variation of nearly 20 per cent about the higher job satisfaction in firms with high entrepreneur innovation. Furthermore, we can find that the effects of

Table XII. The effects of entrepreneur innovative spirit on workers' participation in corporation governance (2013-2015 Panel)

Classification	Whether workers can participate in corporation governance (0-1 dummy)			
	Logit (1)	Logit (2)	OLS (3)	OLS (4)
Whether having higher openness or not (0-1 dummy)	0.071*** (3.35)	0.054*** (2.49)	0.0662*** (3.323)	0.0508** (2.549)
Other controls	no	yes	no	yes
Industry fixed effects	yes	yes	yes	yes
City fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
Observations	2,498	2,498	2,498	2,498
(Pseudo) *R*-squared	0.049	0.077	0.066	0.100

Notes: Numbers in parentheses are *t* statistics with robust standard errors. ** and ***represent the significance at 5 and 1% levels, respectively

$WPCG_{ijdt}$ on workers' job satisfaction are also significantly positive at least 5 per cent level, which means that workers' participation in corporation governance ($WPCG_{ijdt}$) indeed have direct impacts in eliminating workers' job satisfaction.

In summary, in combination with regression results shown in Tables XII-XIV, we can find that, workers' participation in corporation governance is an important mediating channel in which entrepreneur innovation can eliminate labor conflicts. These findings are consistent with *H9*.

6. Conclusion

With a unique, self-collected data set (CEES), this paper provides a new path to solve the problem of rising labor conflicts in China. We find that increasing entrepreneur innovation may be an important channel to eliminate labor conflicts.

The three main findings are as follows:

Table XIII. The effects of entrepreneur innovative capacity on workers' participation in corporation governance (2013-2015 Panel)

Classification	Whether workers can participate in corporation governance (0-1 dummy) Logit (1)	Logit (2)	OLS (3)	OLS (4)
Whether having higher CEO education (0-1 dummy)	0.105*** (4.80)	0.067*** (2.90)	0.0990*** (4.758)	0.0630*** (2.909)
Other controls	no	yes	no	yes
Industry fixed effects	yes	yes	yes	yes
City fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
Observations	2,514	2,514	2,517	2,517
(Pseudo) *R*-squared	0.049	0.073	0.065	0.096

Notes: Numbers in parentheses are *t* statistics with robust standard errors. ***represent the significance at 1% levels

Table XIV. The effects of entrepreneur innovation and workers' participation in corporation governance on job satisfaction (2013-2015 Panel)

Classification	Dependent variable: job satisfaction (the firm-level average in logs) (1)	(2)	(3)	(4)
The average openness of personality traits by managers (in logs)	0.128** (2.335)	0.101** (2.190)		
CEO education (in logs)			0.0725* (1.685)	0.0512* (1.668)
Whether workers can be participated in corporation governance (0-1 dummy)		0.0124** (2.395)		0.0135*** (2.728)
Other controls	yes	yes	yes	yes
Industry fixed effects	yes	yes	yes	yes
City fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
Observations	2,490	2,490	2,430	2,430
R-squared	0.111	0.113	0.125	0.128

Notes: Numbers in parentheses are *t* statistics with robust standard errors. *, ** and ***represent the significance at 10, 5 and 1% levels, respectively

First, based on benchmark regressions and robustness checks, this paper finds that entrepreneur innovation can have significant impacts in eliminating labor conflicts. On one hand, results in benchmark regressions find that when entrepreneur innovative spirits and entrepreneur innovation capacity are stronger, the average of workers' job satisfaction is significantly higher. On the other hand, results in robustness checks find that, the effects of entrepreneur innovation are significantly positive in increasing workers' incentives, social welfare, job development and stability. Therefore, these mean that for firms with higher entrepreneur innovation, they will take more steps to eliminate potential risks of labor conflicts.

Second, based on interaction term regressions, this paper finds that there exist heterogeneous effects of entrepreneur innovation on labor conflicts. In comparison with firms of state-owned enterprises (SOE), Hong Kong/Taiwan/Macao (HTM) invested firms and foreign (FOR) invested firms, the effects of entrepreneur innovation on labor conflicts are much stronger in private firms. In comparison with firms of lower market power, the effects of entrepreneur innovation on labor conflicts are more concentrated on firms with stronger market power. Besides those mentioned above, we also find that the effects of entrepreneur innovation in eliminating labor conflicts are weaker for export firms.

Third, results in mediating effect model show that, workers' participation in corporation governance is an important channel in which entrepreneur innovation has impacts on labor conflicts. Regression results find that when adding the variable measuring workers' participation in corporation governance into right hand-side of estimation equation, we can find it can effectively explain 21.1∼29.4 per cent variation about the effects of entrepreneur innovation on labor conflicts.

Because of space limitation, this paper couldn't focus on the reason entrepreneur innovation can eliminate labor conflicts. We shall discuss this topic in another paper.

Notes

1. According to the sampling method, the proportion of senior and middle managers in CEES worker samples is 30 per cent.
2. CESC was under Wuhan University Institute of Quality and Development Strategy (WHU-IQDS), which was co-founded in 2007 by Wuhan University and the General Administration of Quality Supervision, Inspection and Quarantine of China (AQSIQ), the supreme regulatory agency for both internationally traded and domestically sold products in China. Hong Cheng is the founding Dean of WHU-IQDS. The Institute provides training for AQSIQ officials at all administrative levels and has alumni in more than half of all prefectural cities and counties in China. Over 100,000 government officials and entrepreneurs in 18 provinces have attended lectures of IQDS.
3. For CEO ages, the bottom 20 per cent subgroup means the firms which have the youngest CEO and have higher entrepreneur innovation.

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