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How do firms respond to minimum wage regulation in China? Evidence from Chinese private firms☆

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ABSTRACT

To study how firms respond to minimum wage regulation in China, this paper empirically explores a number of dimensions along which firms adjust in response to minimum wage differences, using three waves of a national survey of Chinese private firms. Consistent with the predictions of economic theory, we find that private firms in China respond to minimum wage increases by cutting various fringe benefits such as pension and insurance, and by laying off low-skilled workers and short-term workers. Despite these adjustments, firms cannot fully mitigate the detrimental effects on firm profitability when faced with adverse demand shocks because of the wage rigidity introduced by minimum wage regulation. These findings highlight the unintended consequences of minimum wage regulation on the private sector in China.

1. Introduction

The economic consequences of minimum wage regulation have long been controversial. While some research presents evidence that minimum wage regulation has helped youth employment and contributed to poverty reduction (Alaniz, Gindling, & Terrell, 2011; Card, 1992; Gindling & Terrell, 2010), others find that labor market regulations such as minimum wages and employment protection are less effective in protecting low wage workers, but instead lead to unemployment, income inequality, and poverty by increasing the rigidity of labor market (Acemoglu & Angrist, 2001; Botero, Djankov, La Porta, Lopez-De-Silanes, & Shleifer, 2004; DeLeire, 2000; Heckman, 2000; Ippolito, 1988; Neumark, Cunningham, & Siga, 2006; Neumark, Schweitzer, & Wascher, 2005). The fundamental reason for the unintended consequences of minimum wage regulation is that its effectiveness can be mitigated by various offsetting behaviors of employers (Wang & Gunderson, 2015). For example, the regulated firms may respond to a minimum wage hike by adjusting employment, working hours, fringe benefits, and so on.

Three additional gaps exist in the literature. While most studies focus on the direct effects of minimum wages on wage rates, income distribution, and employment, fewer studies explore how firms adjust fringe benefits in response to minimum wage changes. Moreover, very little is known about the extent to which firms' offsetting behaviors can mitigate the potential

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detrimental effects of the minimum wage regulation on firm performance (e.g., profitability) (Draca, Machin, & Van Reenen, 2011). Finally, as noted by Hamermesh (2002) and Gindling and Terrell (2004), the available literature on minimum wages is mostly based on developed countries, yet labor institutions and enforcement in developing countries differ in important ways (Lemos, 2009).

In the current study, we attempt to fill some of the gaps in the literature by examining the offsetting behaviors of private firms in response to minimum wage regulation in China. As the largest emerging economy in the world, China provides us a unique institutional setting to study firm responses to minimum wage regulation in a developing country setting. First of all, China has introduced minimum wage legislations since 1993 and minimum wages have been frequently used as a policy instrument to regulate the country's labor market. Additionally, a large number of low skilled and migrant workers are absorbed by the fast growing private sector where monitoring and enforcing of labor legislations are of great concern (Ge, 2007; Shen & Yao, 2008). Under these circumstances, the real impact of minimum wage regulation in China is of particular interest to both economists and policy makers.

With three waves of a national survey of private firms in 2004, 2006 and 2008, which comprises both large firms and individual household enterprises drawn from 31 provinces in mainland China,[1] we empirically study how firms adjust along a number of dimensions in response to higher minimum wages. Specifically, we first examine how firms adjust wages and a broad range of fringe benefits when mandatory minimum wages rise. This is especially important in China as fringe benefits can be an important component of total compensation and can vary considerably. We find that firms respond to the wage hike by cutting expenditures on various fringe benefits including pension and various insurances. Then, we study how firms alter both the number of workers employed and the mix of workers with different labor contracts and skill levels, and the results show that firms respond to increases in labor cost by laying off low-skilled workers and short-term workers. Finally, we study the extent to which firms can mitigate the potential negative impact of minimum wage hikes on firm performance when faced with market shocks, providing evidence that minimum wage regulation hurts firm performance in the presence of adverse shocks.

The remainder of the paper is organized as follows: Section 2 provides an overview of the relevant literature; Section 3 describes the institutional background on minimum wage legislation and implementation in China; Section 4 discusses the data and empirical strategy; and the main results of the econometric analysis are reported in Section 5. A short conclusion is given in Section 6.

2. Literature review

Our study is closely related to several strands of literature on the economic effects of minimum wage regulation. The first relevant body of literature is on how minimum wages affect employment, which has been studied extensively in the literature.[2] Although the neoclassical model predicts that minimum wage regulation has a negative impact on employment by raising the wages of low paid workers (Borjas, 2009; Brown, 1999), the empirical literature has provided mixed results. Many studies find that minimum wages have a negative effect on employment especially for young and unskilled workers (Burkhauser, Couch, & Wittenburg, 2000; Gindling & Terrell, 2004; Maloney & Mendez, 2004; Neumark & Wascher, 1992; Neumark et al., 2006; Pereira, 2003), but others find no impact or, in some cases, positive effects (Card, 1992; Card & Krueger, 1994; Katz & Krueger, 1992; Machin, Manning, & Rahman, 2003). Nevertheless, as pointed out by Burkhauser et al. (2000), the employment effect, whether it is negative or positive, is relatively modest.

As one justification for minimum wage legislation is to redistribute income to low wage workers, a large literature has been devoted to investigate the effect of minimum wage legislation on labor income. Some studies find that increases in minimum wages contribute to the reduction of poverty and income inequality by increasing the income levels of those affected by the legislation (Alaniz et al., 2011; Gindling & Terrell, 2010; Machin & Manning, 1997). However, other researchers argue that when taking into account the adjustments of employment and fringe benefits following contemporaneous wage increases, the combined effect on income is negative for low-wage workers (Neumark & Wascher, 2001; Neumark et al., 2005, 2006; Wessels, 1980).

As firms may react to a minimum wage hike by reducing expenditures on non-wage components, one strand of literature attempts to identify the substitution effects between minimum wages and various non-wage components such as training investment (Acemoglu & Pischke, 2003; Hashimoto, 1982; Neumark & Wascher, 2001), insurance, pension coverage, educational benefits, and work place safety (Simon & Kaestner, 2004). Card (1995) reviews the limited evidence and concludes that the evidence is mixed.

Another limitation of the bulk of literature is the relative neglect of labor regulation's impact on firm performance, with two exceptions. In a pioneering paper, Draca et al. (2011) provide evidence that the introduction of a national minimum wage to the UK labor market in 1999 significantly reduces firm profitability. Cuong (2013) finds that higher minimum wages in Vietnam have a negative but not statistically significant impact on profitability of private firms.

Furthermore, while the literature is abundant regarding minimum wage regulation in developed countries, studies on the economic impacts of minimum wage in developing economies such as China are relatively few in number. To the extent minimum wages are researched in these countries, the studies have been mostly limited to the employment effect and have produced mixed and controversial findings. Using data from 2000 to 2007, Wang and Gunderson (2011) provide evidence that minimum wages have negative employment effects in slower growing regions and non-state-owned firms. In a study of the eastern regions

[1] Provinces in this paper refer to all provincial-level administrative divisions in mainland China, including 22 provinces, 4 provincial level cities (Beijing, Shanghai, Tianjin, and Chongqing), and 5 autonomous regions.

[2] See the recent comprehensive review by Neumark and Wascher (2007a, 2007b).

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in China, Wang and Gunderson (2012) find that minimum wages in China do have an adverse but statistically insignificant effect on employment and have no impact on aggregate wages. Ding (2010) finds that minimum wage increase significantly reduces the employment of migrant works but has no effect on urban residents. Using county level data from 16 provinces, Fang and Lin (2013) find that minimum wage changes have significant negative effects on employment in the more prosperous eastern region of China, especially for females, young adults and less-skilled workers. Peng and Zhang (2011) also provide evidence that minimum wage increases in China reduce the employment of female workers and increase the weekly working hours of male workers. By conducting qualitative interviews with employees, employers and government labor inspectors in two cities in eastern China, Wang and Gunderson (2015) find that employers in China offset minimum wages by freezing wage increases and reducing the non-wage components of compensation.

The current paper contributes to the literature on minimum wage regulation by studying a broader scope of firm responses in the context of China. First, our work adds to the literature on the compensation effects of the minimum wage by studying how higher minimum wages lead firms to substitute wages for fringe benefits in China. Second, this paper provides further evidence on how firms alter the number of workers employed and the mix of workers with different terms of labor contracts and skill levels in order to realign the marginal product of labor with their wage. Third, we study the often-neglected consequences of minimum wage regulation on firm profitability by studying the abilities of firms to mitigate the potential negative impact of minimum wage in face of market shocks. To summarize, this study intends to help improve our understanding of the impact of minimum wage regulation in general and especially in developing countries, by exploring a wider scope of effects of the regulation on Chinese private firms.

3. Institutional background

While minimum wage regulation has been practiced for a long time in the Western world, the legislation and implementation of minimum wages in China are a relatively new phenomenon. In 1984, China officially recognized the *Minimum Wage-Fixing Machinery Convention* established by the International Labor Organization in 1928, but it was not until 1993 when China passed its first minimum wage legislation. For the first time, the *Regulation on Enterprise Minimum Wages* of 1993 established the general legal framework for minimum wage regulation in China. According to the *regulation*, China does not set a single national minimum wage for the entire nation. Instead, the task of setting and enforcing minimum wages is delegated to local governments. Under the guidance and supervision of the central government, each province sets its own minimum wage rates in accordance with its own local conditions such as basic living expenses, average wages, labor productivity, unemployment level, and so on, thus providing considerable flexibility for the local government and resulting in substantial differentials in minimum wages among regions. In the *regulation*, the frequency of minimum wage adjustments was specified to not exceed once every year, and the penalty for firms violating minimum wage regulation is set at 20% to 100% of the owed wage. Furthermore, overtime pay, compensation for extreme working conditions, and other non-wage benefits prescribed by national laws, regulations and policies are not included as part of the wage when calculating minimum wages.[3] In July 1994, minimum wage regulations were further written into China's *Labor Law*. And by the end of 1995, 24 out of the total 31provinces had set their minimum wages. By 2004, all provinces in China have set their minimum wages.

In 2004, the *Regulation on Enterprise Minimum Wages* was replaced by the more general *Regulation on Minimum Wages*. The first feature of the newly revised regulation is to extend the coverage of minimum wages to self-employed businesses with other employees and part-time workers, with hourly minimum-wage introduced to cover part-time employment. Second, both monitoring and enforcement of minimum wage are strengthened, with the penalty for firm violation substantially increased to between 100% and 500% of the owed wage. Local governments are required to publish the minimum wage rates and their coverage in the local government bulletins and at least one of the major newspapers in the region within a week after any new adjustment. In addition, the adjustment frequency of minimum wages is set to be at least once every 2 years. The newly revised regulations took effect in April 2004 and led to substantial increases in minimum wages across the nation in the same year.

Fig. 1 presents the nominal and real minimum wages (yearly average minimum wages in 2000 RMB) in China from 2000 to 2012, as well as the number of provinces that adjusted minimum wage standards in each year.[4] As shown in the figure, both nominal and real minimum wages have experienced rapid growth during this period, with nominal minimum wages increasing by 270.49% and real minimum wages increasing by 174.66% during the period. After China issued the new *Regulation on Minimum wages* in 2004, minimum wage adjustments have become more frequent, accompanied by rapid increases in minimum wages. At the end of 2008, the Department of Human Resources and Social Security instructed local governments to restrain from increasing minimum wages in 2009 to help alleviate the influence of global financial crisis. In response, none of the provinces increased minimum wages in 2009. As the influence of global financial crisis faded, a new round of minimum wage increases was launched in 2010, followed by additional adjustments afterward.

In summary, China has seen relatively frequent changes over time in minimum wages. At the same time, there exist substantial variations across regions as local governments have much discretion in setting their own regional minimum wages. Take 2004 as an example, the highest minimum wage was 8208 yuan in Guangdong province, while the lowest was 3840 yuan in Shanxi province, merely 46.78% of that in Guangdong. Moreover, as shown in Fig. 1, local governments' discretion in setting regional

[3] In some provinces like Shanghai, social security benefits and housing subsidy are included when calculating hourly minimum wage. But the minimum wage standards used in this study are monthly minimum wages which exclude fringe benefits, and the regulation on hourly minimum wage doesn't affect our analysis.

[4] Minimum wage data before 2000 are not available for many provinces, therefore we choose to report minimum wage levels between 2000 and 2012.

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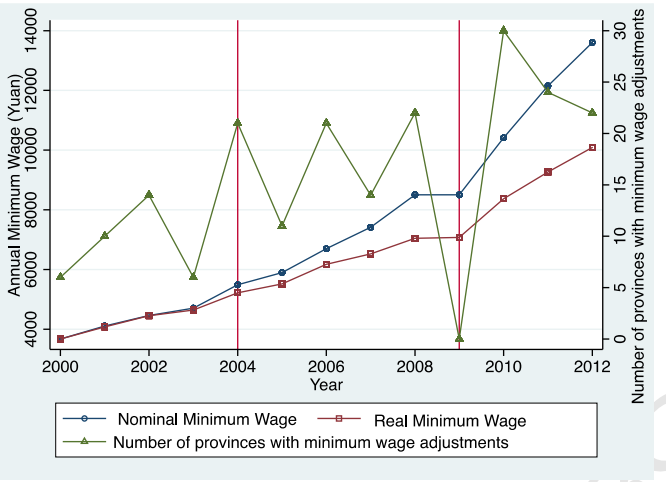

Fig. 1. Minimum wages in China (2000–2012). Notes: Real minimum wages are adjusted for inflation and expressed in 2000 RMB. Data sources: The minimum wage data are obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007. The price index is from the CEIC database.

minimum wages also results in substantial variations across different provinces in the frequency of minimum wage adjustments. Before the new regulation in 2004, fewer than 10 provinces raised their minimum wage standards each year on average. Since 2004, however, the average number of provinces that adjust local minimum wages has substantially increased to around 20. These variations in minimum wages across different regions in China thus provide a good test ground for studying the impact of minimum wage regulations.

4. Empirical strategy and data

In this section, we describe the empirical strategy and the data used to explore the impact of minimum wages on various outcomes. Given the cross-section nature of our data, our key empirical strategy is to identify the impact of minimum wages by utilizing their variations across regions.

4.1. Model specification

First, we estimate the following regression to test the relationship between the outcome variables and minimum wage rate after controlling for other relevant factors:

$$Y_{ijkt} = \beta \ln\left(\text{minimum wage}_{jt}\right) + X_{ijkt}\delta + \beta_j + \beta_t + \beta_k + \varepsilon_{ijkt} \quad (1)$$

where Y_{ijkt} is the outcome variable for firm i from province j, sector k, in year t, ln(minimum wage_{jt}) is the logarithm of minimum wage rate in province j in year t, X_{ijkt} is a set of firm level controls, while ε_{ijkt} is the random noise term.[5] The outcome variable will be measured by three sets of indicators for compensation (including wage and fringe benefits), employment, and firm performance, respectively. Measures of wage and fringe benefits include firm level indicators on coverage and per capita payment: While the coverage indicators include the percentages of workers covered by labor contracts (collective or individual), medical insurance, pension, unemployment insurance, injury insurance, and maternity insurance, respectively, the per capita payment indicators include per capita wage, dividend, medical insurance, pension, unemployment insurance, injury insurance, and maternity insurance (all in logs).[6] For employment measures, we use the size of firm employment, the growth rate of firm employment, the percentage of employees hired from previously laid-off workers or rural migrant workers, the percentage of employees with 1 to 6 month labor contracts, the percentage of employees with 6 to 12 month labor contracts, and the percentage of employees with 1 to 12 month labor contracts. Finally, we use return on equity (ROE) to measure firm profitability. In all regressions, we estimated the coefficients by ordinary least squares.[7]

[5] We use the natural logs of minimum wages based on several reasons from the econometric literature (Wooldridge, 2009). First, strictly positive variables (like minimum wage) often have conditional distributions that are heteroskedastic or skewed, and taking the log can mitigate the problem. Second, taking logs narrows the range of the variable and make the estimates less sensitive to the extreme value of independent variable.

[6] When the dependent variable y contains the value of zero, we use log (1 + y) to approximate its logarithm. This approximation is acceptable because the data on y contains relatively few zeroes (Wooldridge, 2009).

[7] For measures of coverage, we also estimated the coefficients by fractional logit model and find similar results.

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Given that the firms included in the sample are not tracked over time, our data is a repeated cross-section rather than a panel, thus we are not able to study firm responses to minimum wage changes over time, but will rely on regional difference to disentangle the effects of minimum wages instead. As a result, our analysis may suffer from the usual issue of endogeneity. Section 5.4 will further address this issue, but first of all, we alleviate the concern of omitted variables by including a host of variables that may affect the outcome variables throughout the analysis. Furthermore, we will present heterogeneity results for different groups of firms, by their location in the wage distribution, their size, and their sectors and regions. As the findings show the greatest effects of minimum wages for groups as predicted by economic theories, they provide additional support for the minimum wage effects.

Regarding control variables, the first set include firm attributes such as *trade union* (a dummy variable taking the value of one if the firm has established a trade union, and zero otherwise), *asset* (the logarithm of total fixed asset), *firm age* (the number of years since the firm's establishment), and *leverage* (total amount of debt divided by total assets). Although the unit of analysis in this study is a firm, we also include entrepreneur attributes to control for their possible impacts given the central role played by private entrepreneurs in their firms. The variables contain private entrepreneur attributes including *female* (a dummy variable of value one if the private entrepreneur is female, and zero otherwise), *education* (years of formal schooling), *cadre* (a dummy variable taking value one if the private entrepreneur formerly worked as a government official, and zero otherwise), *former manager* (a dummy variable taking value one if the private entrepreneur formerly worked as a manager in state-owned enterprises or township and village enterprises, and zero otherwise), and *PC* or *CPPCC* membership (a dummy variable taking value one if the entrepreneur holds memberships in the People's Congress (PC) or the Chinese People's Political Consultative Conference (CPPCC) at various levels, and zero otherwise). In addition, we include provincial level average wages to control for the level of economic development and living expenses in the corresponding region. Finally, provincial, year, and sector dummies are included to control for province, year, and industry specific factors that may affect outcome variables.

4.2. Data

The firm level data used in this study come from three waves of a national survey of privately owned enterprises in China, which were conducted in 2004, 2006 and 2008, jointly by the All China Industry and Commerce Federation, the China Society of Private Economy at Chinese Academy of Social Sciences, and the United Front Work Department of the Chinese Communist Party (the CCP).[8] The sampling method used in the survey was multistage-stratified random sampling to achieve a balanced representation of private firms across all regions and industries. First, the total number of private enterprises to be surveyed was determined. In the second step, six cities or counties were selected from each province, including the capital city, one prefecture-level city, one county-level city, and three counties. Next, the number of private enterprises to be surveyed in each province was determined as the product of the share of local private enterprises in the national total with the national sample size. The number of firms in each city, county and sector was likewise decided.

The survey was then conducted through intensive interviews with firm owners. Information about owner attributes such as family background, human capital, political connections, and occupational experiences, as well as firm attributes such as size, age, and basic financial background was collected. More importantly, the survey collected very detailed information on firm level wage and non-wage benefits, which provides us the opportunity to study how private firms respond to increases in minimum wages.[9] By far, this dataset is the best for studying the economic effects of minimum wages on private firms in China.

As the firm location can only be identified at province level, provincial minimum wages are the most disaggregate information that matches the firm level data in this study. The provincial level minimum wage data used in this research are obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007.[10] Monthly minimum wages are converted to annual minimum wages to match the firm data. When a province is divided into different classes of districts according to the level of economic development and different minimum wages are implemented accordingly, we use the highest value among the several minimum wage standards in a province to measure the level of minimum wage, because lower values are applicable for less developed areas with potentially fewer firms included in our dataset.[11] When minimum wages are adjusted in the middle of the year, we use the most updated value.[12]

Table 1 presents summary statistics of the main variables. Both the minimum wage variable and various dependent variables exhibit substantial variations in our sample. A few additional patterns are worth highlighting. First, about 60% of employees are hired from laid-off workers or rural migrant workers, and 28% have contracts shorter than 1 year, offering an opportunity to study the effects of minimum wages on low skilled and temporary workers. Second, a simple sum of the various benefits that we have amount information on suggests that the average total benefits is about 2600 RMB per year, which is close to 20% of

[8] The survey collects prior year information from the previous year thus the firm information in our data corresponds to 2003, 2005, and 2007. Every year firms in the survey are resampled nationally, thus the data is a repeated cross-section data.

[9] For some indicators, for example, number of employee, both information in the current year and the preceding year is collected.

[10] All provinces, provincial level cities and autonomous regions are included in our sample but minimum wage information for Tibet is not available before 2004 as minimum wage legislation is not introduced to Tibet until the end of 2004. We deflate the variables in current price by provincial price indices and convert them to 2000 RMB.

[11] As a robustness check, we also use both the lowest value of provincial minimum wage and average values to estimate the effects of minimum wages. Similar patterns are found, but the estimates are much weaker, perhaps indicating that they are less accurate.

[12] We also use minimum wage value before updating as a robustness check and find similar results. All results from robustness checks are available upon request.

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Table 1
Summary statistics.

Variable	Observations	Mean	Std. dev.	Min	Max
Independent variables					
Minimum wage (ten-thousand yuan)	92	0.554	0.148	0.291	0.929
Trade union (0,1)	4082	0.558	0.497	0	1
ln (asset) (ten-thousand yuan)	4082	5.66	1.83	−11.6	18.3
Firm age (year)	4082	7.06	4.33	0	27
Leverage	3515	0.488	0.775	0	2.8
Female (0,1)	4082	0.124	0.33	0	1
Education (year)	4082	14.2	2.81	6	19
Cadre (0,1)	4082	0.193	0.395	0	1
Former manager (0,1)	4082	0.331	0.471	0	1
PC or CPPCC (0,1)	4082	0.461	0.499	0	1
Provincial average wage (ten-thousand yuan)	93	1.722	0.661	0.851	4.264
Dependent variables					
Measures of wage and benefits					
Coverage					
Collective contract (coverage)	1452	0.26	0.41	0	1
Individual contract (coverage)	3600	0.74	0.35	0	1
Medical insurance (coverage)	3347	0.31	0.39	0	1
Pension (coverage)	3415	0.35	0.38	0	1
Unemployment insurance (coverage)	3265	0.22	0.35	0	1
Injury insurance (coverage)	1980	0.35	0.41	0	1
Maternity insurance (coverage)	1886	0.16	0.31	0	1
Per capita payment (annual)					
Dividend (ten-thousand yuan)	1641	0.11	0.5	0	9.33
Wage (ten-thousand yuan)	1868	1.52	1.2	0.01	13.88
Medical insurance (ten-thousand yuan)	3664	0.04	0.11	0	2.5
Pension per capita (ten-thousand yuan)	3701	0.09	0.25	0	8
Unemployment insurance (ten-thousand yuan)	3549	0.01	0.05	0	1
Injury insurance (ten-thousand yuan)	2193	0.01	0.02	0	0.08
Maternity insurance (ten-thousand yuan)	2109	0.01	0.03	0	0.67
Measures of employment					
ln (employment)	3998	4.12	1.51	0	9.8
Employment growth rate	2422	0.13	0.22	−0.66	0.93
Laid-off & rural migrant worker percentage	1799	0.62	0.27	0	1
1–6 months worker percentage	2546	0.13	0.21	0	1
6–12 months worker percentage	2780	0.21	0.27	0	1
1–12 months worker percentage	2391	0.28	0.34	0	1
Dependent variables on firm performance					
ROE	3668	0.26	0.533	−0.198	3.33

Notes: All of the variables in current price are adjusted for inflation and expressed in 2000 RMB.
Variable definitions: leverage (total amount of debt divided by total assets), ROE (return on equity), cadre (a dummy variable taking the value of one if the private entrepreneur formerly worked as a government official, and zero otherwise), former manager (a dummy variable taking the value of one if the private entrepreneur formerly worked as a manager in state-owned enterprises or township and village enterprises, and zero otherwise), and PC or CPPCC membership (a dummy variable taking the value of one if the entrepreneur holds memberships in the People's Congress (PC) or the Chinese People's Political Consultative Conference (CPPCC) at various levels, and zero otherwise).
Data sources: The firm level data comes from the National Surveys of Privately Owned Enterprises in China in 2004, 2006 and 2008. The minimum wage data are obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007.

the sample average annual wage or about 50% of the minimum wage, allowing firms substantial room to offset minimum wages' effects.

The minimum wage law requires that all employees in China, whether in the private or the public sector, be paid no less than the minimum wage. It is important to check for compliance before examining the impact of minimum wage legislation. Given that each province in China has its own minimum wage, we plot the distribution of firm average wage minus the corresponding minimum wage for each firm, with zero indicating that the firm average wage equals the regional minimum wage. Fig. 2 presents the distributions of firm wages for different firm sizes, with firm sizes divided into four quartiles based on their asset. It is clear that a substantial proportion of firms pay their employees less than the legal minimum wage level, accounting for between 26.2% in the bottom quartile and 11.8% in the top quartile. And consistent with expectations, non-compliance is more severe for smaller firms where monitoring is more difficult. Indeed, violations of minimum wage legislation have become an important source of labor disputes in China since 2007. For example, data from Peking University legal case database (*BeiDaFaBao*) shows that over 5000 labor dispute cases are related to the violation of local minimum wages by employers, accounting for about 3% of all labor dispute cases in the database. In a bulletin published in 2014 by All-China Federation of Trade Unions, violations of minimum wage are listed among the top ten case categories involving labor law violations in China. Wang and Gunderson (2015) also find non-

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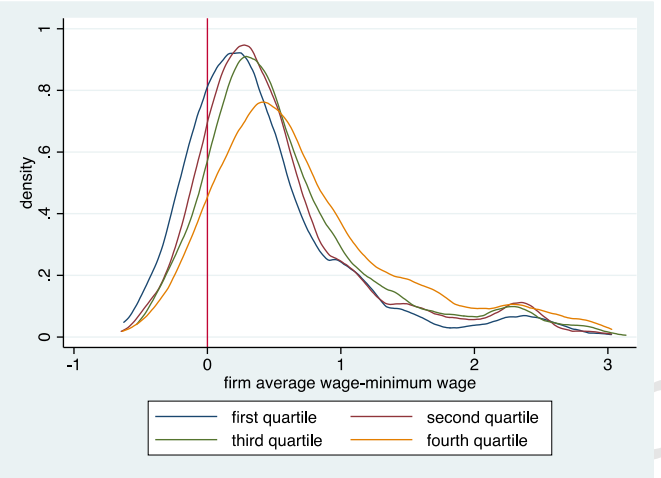

Fig. 2. Firm's average wage minus the minimum wage. Notes: Annual minimum wages and firm average wages are in 10,000 yuans (expressed in year 2000 RMB). Data sources: The firm level wage data comes from the National Surveys of Privately Owned Enterprises in China in 2004, 2006 and 2008. The minimum wage data are obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007.

compliance to minimum wage legislation to be quite widespread in China. But overall, the vast majority of firms abide by the legislation (80.9% in our sample), justifying our exploration into the impact of minimum wage legislation.

5. Main results

This section presents the main results from our empirical analysis. We first discuss the effects of minimum wages on three sets of outcome variables one at a time, wage and fringe benefits, employment quantity and structure, and firm performance in Sections 5.1~5.3. Then we address the issue of endogeneity and provide additional results from various robustness tests in Section 5.4.

5.1. Effect of minimum wage on wage and fringe benefits

In response to higher minimum wages, firms could reduce worker benefits as they are not computed in minimum wage. We first estimate how minimum wages affect workers' wages and fringe benefits, using the full sample. The results are presented in Table 2, where Panel A gives the results on the impact of minimum wages on the coverage of various employment fringe benefits, while Panel B provides the results on the effects on the per capital amount of wage as well as other benefits. The results indicate that minimum wage rate has negative effects on a wide variety of fringe benefit measures, including the coverage of pension, unemployment insurance, medical insurance, and injury insurance, as well as per capita payment in dividends and unemployment insurance. The magnitude of the effects on fringe benefits is far from trivial. For instance, the average coverage of unemployment insurance is 22% and the coefficient of the ln (minimum wage) is −0.267. This implies that a 10% increase in the minimum wage gives rise to a 2.7% reduction in the coverage of unemployment insurance, or a 12% fall relative to the mean coverage of 22%.

Consistent with the existing literature, we find that firm attributes including union presence, firm size, profitability, leverage and entrepreneur attributes such as years of education and managerial experience are all positively correlated with wages and fringe benefits. Due to space limitations, we will not provide the results on control variables in later tables, although they are controlled throughout our analysis and exhibit expected effects persistently.

Since minimum wages will have a larger impact on firms whose average wages are close to the minimum wage, we adopt an empirical strategy to separately estimate minimum wage effects at different parts of the wage distribution (Alaniz et al., 2011; Neumark et al., 2006). Specifically, we divide the wage distribution into four parts: (0, minimum wage − 1000 yuan), [minimum wage − 1000 yuan, minimum wage + 1000 yuan], [minimum wage − 2000 yuan, minimum wage + 2000 yuan], (minimum wage + 2000 yuan, +∞).[13] The results are reported in Table 3, Panel A for coverage and Panel B for per capita payment of benefits, respectively.

In the first part of Panel A and Panel B, we estimate the minimum wage effects for firms whose average wages are more than 1000 yuan below the minimum wage, and find that minimum wage has a negative impact on some fringe benefits (including the coverage of medical insurance, injury insurance, and maternity insurance, as well as per capita payment in dividends, medical insurance, unemployment insurance, injury insurance, and maternity insurance.) and a positive impact on wage, with most of the estimated effects being weak and insignificant.

[13] Our results are robust to alternative divisions of wage distribution. In the robustness check, we divide the wage distribution into below 90%, within 90% to 110%, and above 110% of the minimum wage, we find that the results are similar (see Table A in the appendix).

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Table 2
The effects of minimum wage on fringe benefits and wage (OLS, full sample).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Coverage							
Variables	Collective contract	Individual contract	Medical insurance	Pension	Unemployment insurance	Injury insurance	Maternity insurance
Mean of coverage variables	0.26	0.74	0.31	0.35	0.22	0.35	0.16
ln (minimum wage)	0.0773	−0.102	−0.216**	−0.175*	−0.267**	−0.329*	−0.0145
	(0.236)	(0.0977)	(0.106)	(0.0959)	(0.111)	(0.169)	(0.137)
Trade union	0.157***	0.0689***	0.0802***	0.0849***	0.0700***	0.107***	0.0648***
	(0.0342)	(0.0131)	(0.0146)	(0.0110)	(0.0104)	(0.0254)	(0.0154)
ln (asset)	0.0238***	0.0156**	0.0306***	0.0288***	0.0245***	0.0365***	0.0185***
	(0.00821)	(0.00583)	(0.00469)	(0.00391)	(0.00344)	(0.00739)	(0.00454)
Firm age	−0.00404*	0.00113	−0.000330	0.000356	0.000828	−0.00715*	−0.00156
	(0.00230)	(0.00225)	(0.00203)	(0.00142)	(0.00209)	(0.00359)	(0.00177)
ROE	0.00411	0.00258	0.0165***	0.00895*	0.0114***	0.0160***	0.00403
	(0.00451)	(0.00216)	(0.00425)	(0.00486)	(0.00372)	(0.00580)	(0.00331)
Leverage	0.0224**	0.0210**	0.0212***	0.0311***	0.0236***	0.0196**	0.00832
	(0.00866)	(0.00941)	(0.00695)	(0.00653)	(0.00776)	(0.00914)	(0.00965)
Female	0.0530	−0.00241	−0.0165	−0.0227	−0.0269**	−0.00757	0.00642
	(0.0342)	(0.0199)	(0.0241)	(0.0170)	(0.00998)	(0.0270)	(0.0203)
Education	0.00263	0.00645**	0.00853***	0.00963***	0.0115***	0.00820**	0.00838***
	(0.00315)	(0.00270)	(0.00275)	(0.00282)	(0.00226)	(0.00334)	(0.00285)
Cadre	0.0177	0.0492***	0.00510	0.0523*	0.0163	−0.0150	−0.00652
	(0.0253)	(0.0155)	(0.0209)	(0.0282)	(0.0249)	(0.0350)	(0.0145)
Former manager	0.0359*	0.00214	0.0484**	0.0657***	0.0745***	0.0572*	0.0563*
	(0.0190)	(0.0136)	(0.0186)	(0.0174)	(0.0151)	(0.0295)	(0.0325)
PC or CPPCC	0.0883***	0.00688	−0.0340*	−0.0196	−0.0567***	−0.0202	−0.0390*
	(0.0206)	(0.0155)	(0.0179)	(0.0137)	(0.0203)	(0.0283)	(0.0229)
Constant	−0.0862	0.359***	−0.310**	−0.412***	−0.518***	−0.155	−0.0834
	(0.333)	(0.0894)	(0.118)	(0.107)	(0.104)	(0.181)	(0.182)
Observations	1282	2885	2773	2822	2728	1733	1666
R-squared	0.157	0.085	0.148	0.216	0.182	0.184	0.159
Panel B: Per capita payment (in logarithm)							
Variables	Dividend	Wage	Medical insurance	Pension	Unemployment insurance	Injury insurance	Maternity insurance
Mean of per capita variables	0.11	1.52	0.04	0.09	0.01	0.01	0.01
ln (minimum wage)	−3.193**	0.00317	−1.351	−0.982	−2.015**	−0.993	−1.412
	(1.262)	(0.424)	(0.807)	(1.015)	(0.796)	(1.335)	(1.085)
Trade union	0.157	0.0334	0.740***	1.093***	0.689***	0.629***	0.394***
	(0.182)	(0.0356)	(0.105)	(0.145)	(0.0914)	(0.171)	(0.0986)
ln (asset)	0.0342	0.0656***	0.221***	0.245***	0.149***	0.205***	0.0939***
	(0.0637)	(0.0109)	(0.0367)	(0.0423)	(0.0285)	(0.0498)	(0.0277)
Firm age	0.0157	−0.00350	0.0225	0.0289**	0.0156	−0.0240	−0.0186
	(0.0191)	(0.00311)	(0.0147)	(0.0117)	(0.0129)	(0.0162)	(0.0125)
ROE	0.174	0.0265**	0.130***	0.0779**	0.0778***	0.133***	0.0569**
	(0.114)	(0.0112)	(0.0260)	(0.0299)	(0.0150)	(0.0322)	(0.0273)
Leverage	−0.184	0.0253	0.241***	0.366***	0.192***	0.168**	−0.00222
	(0.109)	(0.0154)	(0.0808)	(0.0507)	(0.0517)	(0.0665)	(0.0669)
Female	−0.0555	0.0264	−0.136	−0.0896	−0.220**	−0.239	−0.0327
	(0.176)	(0.0359)	(0.162)	(0.178)	(0.101)	(0.164)	(0.129)
Education	0.0709*	0.0247***	0.0795***	0.114***	0.0802***	0.0175	0.0539***
	(0.0348)	(0.00558)	(0.0170)	(0.0262)	(0.0164)	(0.0225)	(0.0183)
Cadre	0.314	0.0309	0.317*	0.468***	0.353**	0.133	−0.0665
	(0.227)	(0.0503)	(0.159)	(0.147)	(0.142)	(0.166)	(0.0598)
Former manager	0.531**	−0.0195	0.168	0.342***	0.478***	0.154	0.380**
	(0.216)	(0.0267)	(0.123)	(0.0930)	(0.0834)	(0.151)	(0.170)
PC or CPPCC	−0.0560	−0.0952***	−0.308**	−0.117	−0.401**	−0.112	−0.130
	(0.165)	(0.0312)	(0.137)	(0.134)	(0.161)	(0.201)	(0.157)
Observations	1453	1868	2984	3016	2930	1888	1839
R-squared	0.068	0.190	0.178	0.266	0.193	0.176	0.161
Notes on all panels							
Provincial average wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province, sector, and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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Table 3
Minimum wage effect at different parts of wage distribution (OLS).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Coverage							
Variables	Collective contract	Individual contract	Medical insurance	Pension	Unemployment insurance	Injury insurance	Maternity insurance
Mean of coverage variables	0.26	0.74	0.31	0.35	0.22	0.35	0.16
Wage < minimum wage − 1000							
ln (minimum wage)	−0.991	−0.402	−0.164	1.034	0.346	−0.508	−0.0207
	(1.001)	(1.292)	(0.476)	(0.759)	(0.574)	(0.621)	(0.294)
Minimum wage − 1000 ≤ wage ≤ minimum wage + 1000							
ln (minimum wage)	−0.172	−0.206	−0.383	1.007	0.0468	−0.676	−0.109
	(0.891)	(1.101)	(0.527)	(0.674)	(0.537)	(0.509)	(0.403)
Minimum wage − 2000 ≤ wage ≤ minimum wage + 2000							
ln (minimum wage)	−0.469	−0.601	−0.867	−0.305	−1.282**	−0.587	−1.085***
	(1.430)	(1.097)	(0.821)	(0.550)	(0.589)	(0.999)	(0.370)
Wage > minimum wage + 2000							
ln (minimum wage)	0.0924	−0.117	−0.148	−0.0764	−0.214	−0.178	0.0179
	(0.340)	(0.147)	(0.107)	(0.102)	(0.127)	(0.229)	(0.211)

Panel B: Per capita payment (in logarithm)

Variables	Dividend	Wage	Medical insurance	Pension	Unemployment insurance	Injury insurance	Maternity insurance
Mean of per capita variables	0.11	1.52	0.04	0.09	0.01	0.01	0.01
Wage < minimum wage − 1000							
ln (minimum wage)	−2.316	0.697	−7.690*	1.287	−0.266	−5.101	−3.255**
	(8.666)	(1.156)	(3.927)	(4.684)	(2.482)	(3.103)	(1.242)
Minimum wage − 1000 ≤ wage ≤ minimum wage + 1000							
ln (minimum wage)	1.255	1.008***	−9.786**	0.402	−2.040	−7.210**	−3.562**
	(9.321)	(0.0888)	(3.812)	(4.565)	(3.567)	(3.138)	(1.671)
Minimum wage − 2000 ≤ wage ≤ minimum wage + 2000							
ln (minimum wage)	4.667	1.113***	−18.92***	−5.835	−10.12**	−4.934	−6.026*
	(7.442)	(0.195)	(5.070)	(5.421)	(4.622)	(6.298)	(3.120)
Wage > minimum wage + 2000							
ln (minimum wage)	−4.269**	0.667	−1.230	−0.517	−1.619*	0.197	−1.586
	(2.014)	(0.454)	(1.101)	(1.050)	(0.895)	(1.812)	(1.426)

Notes: Standard errors are clustered at provincial level and reported in parentheses.
All regressions control for firm and entrepreneur attributes, provincial average wage, as well as industrial, year, and provincial fixed effects.
Data sources: The firm level data comes from the National Surveys of Privately Owned Enterprises in China in 2004, 2006 and 2008. The minimum wage data are obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007.
* $p = 0.1$.
** $p = 0.05$.
*** $p = 0.01$.

In the second and third part of both panels, we restrict the sample to firms whose average wages are close to the minimum wage, that is, 1000 yuan and 2000 yuan around the minimum wage. As expected, minimum wage exerts much stronger impacts on wage and fringe benefits. To be more specific, minimum wage has positive and significant effects on wage but negative and significant effects on fringe benefits (including the coverage of unemployment insurance and maternity insurance, as well as per capita payment in medical insurance, injury insurance, and maternity insurance). Take the estimates in the second part of Panel B for example, a 1% increase in minimum wage will lead to roughly 1% increase in workers' average wage, a 9.78% reduction in per capita medical insurance,

Notes to Table 2
Notes: Standard errors are clustered at provincial level and reported in parentheses.
All regressions control for industrial, year, and provincial fixed effects.
Variable definitions: leverage (total amount of debt divided by total assets), ROE (return on equity), cadre (a dummy variable taking the value of one if the private entrepreneur formerly worked as a government official, and zero otherwise), former manager (a dummy variable taking the value of one if the private entrepreneur formerly worked as a manager in state-owned enterprises or township and village enterprises, and zero otherwise), and PC or CPPCC membership (a dummy variable taking the value of one if the entrepreneur holds memberships in the People's Congress (PC) or the Chinese People's Political Consultative Conference (CPPCC) at various levels, and zero otherwise).
Data sources: The firm level data comes from the National Surveys of Privately Owned Enterprises in China in 2004, 2006 and 2008. The minimum wage data are obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007.
* $p = 0.1$.
** $p = 0.5$.
*** $p = 0.01$.

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Table 4
Minimum wage effect on total compensation (OLS).

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Total compensation per worker (in logarithm)					
Mean of total compensation	2.01	2.01	2.01	2.01	2.01
Variables	Wage < minimum wage − 1000	[Minimum wage − 1000, minimum wage + 1000]	[Minimum wage − 2000, minimum wage + 2000]	Wage > minimum wage + 2000	Full sample
ln (minimum wage)	−0.919	0.618	0.624	0.225	−0.237
	(2.178)	(0.618)	(0.450)	(0.316)	(0.490)
Trade union	0.110	0.0185	0.130***	0.0784***	0.110***
	(0.127)	(0.0570)	(0.0466)	(0.0257)	(0.0335)
ln (asset)	−0.149***	−0.0109	−0.0145	−0.0552**	−0.0418*
	(0.0415)	(0.0354)	(0.0250)	(0.0224)	(0.0235)
Firm age	0.0154	−0.00781	−0.00455	0.00216	0.000528
	(0.0191)	(0.00688)	(0.00511)	(0.00334)	(0.00396)
ROE	−0.0168	0.0170	−0.00298	0.0399***	0.0521***
	(0.0599)	(0.0609)	(0.0366)	(0.0143)	(0.0157)
Leverage	0.0625	0.00685	−0.0154	0.0317	0.0796***
	(0.0773)	(0.0261)	(0.0335)	(0.0195)	(0.0198)
ln (capital labor ratio)	0.0846	−0.0349	0.0139	0.166***	0.192***
	(0.119)	(0.0400)	(0.0195)	(0.0298)	(0.0313)
Female	−0.126	0.0904	0.0406	−0.0629*	0.0102
	(0.204)	(0.0608)	(0.0545)	(0.0310)	(0.0364)
Education	0.0480**	0.00545	0.00494	0.0259***	0.0313***
	(0.0193)	(0.00852)	(0.00888)	(0.00489)	(0.00602)
Cadre	−0.249	−0.0696	−0.0146	0.0578	0.0217
	(0.200)	(0.0720)	(0.0479)	(0.0431)	(0.0460)
Former manager	0.0986	0.0814	0.0522	0.0523	0.0648*
	(0.0950)	(0.0652)	(0.0427)	(0.0314)	(0.0319)
PC or CPPCC	0.140	−0.00573	0.00497	−0.0679**	−0.0454
	(0.176)	(0.0336)	(0.0350)	(0.0314)	(0.0413)
Constant	−1.771	0.739	−0.115	0.512	0.141
	(7.651)	(0.771)	(0.480)	(0.337)	(0.438)
Observations	100	103	228	997	1288
R-squared	0.651	0.707	0.531	0.349	0.330
Notes on all panels					
Provincial average wage	Yes	Yes	Yes	Yes	Yes
Province, sector, and year dummies	Yes	Yes	Yes	Yes	Yes

All regressions control for industrial, year, and provincial fixed effects.
Variable definitions: leverage (total amount of debt divided by total assets), ROE (return on equity), cadre (a dummy variable taking the value of one if the private entrepreneur formerly worked as a government official, and zero otherwise), former manager (a dummy variable taking the value of one if the private entrepreneur formerly worked as a manager in state-owned enterprises or township and village enterprises, and zero otherwise), and PC or CPPCC membership (a dummy variable taking the value of one if the entrepreneur holds memberships in the People's Congress (PC) or the Chinese People's Political Consultative Conference (CPPCC) at various levels, and zero otherwise).
Data sources: The firm level data comes from the National Surveys of Privately Owned Enterprises in China in 2004, 2006 and 2008. The minimum wage data are obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007.
* $p = 0.1$.
** $p = 0.05$.
*** $p = 0.01$.

a 7.2% reduction in per capita medical insurance, and a 3.4% reduction in per capita maternity insurance, suggesting that the impact of minimum wage is not only statistically significant but also economically significant.[14] The fourth part shows that firms whose average wages are far above the minimum wage are less likely to be affected by minimum wages.[15]

The opposite effects of minimum wages on average wage and fringe benefits suggest that firms affected by the regulation attempt to offset the impact of higher minimum wage on labor cost by reducing their expenditures on fringe benefits. To study the impact on total compensation, Table 4 presents the combined effects on the sum of wage, dividend and various benefits per capita. We find that higher minimum wages only have a small and insignificant effect on worker's total compensation even for

[14] Consistent with Neumark et al. (2006), we find that the estimated elasticity for wage actually exceeds one when we include the firms below the minimum wage and firms above the minimum wage. Transition between uncovered and covered jobs, among other possible reasons, may lead to overestimation of wage elasticity.
[15] Previous research indicates that minimum wage has a lag effect because the adjustment in technology and management may take time (Neumark & Wascher, 1992; Baker, Benjamin, & Stanger, 1999). We examine the lag effect by replacing the current minimum wage with minimum wage with its one-year lag. We find that minimum wage does not have any significant lag effect on wage but still has a significant and negative impact on fringe benefits. This result is consistent with previous findings that minimum wage benefits low-wage worker contemporaneously, but has an adverse effect after 1 year (Neumark & Wascher, 2001; Neumark et al., 2006; Neumark, Schweitzer, & Wascher, 2004). We do not report these results to save space, but they are available upon request.

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firms whose average wages are around the minimum wage. In contrast to its substantial effect on average wages, a 1% increase in minimum wage only leads to a 0.62% increase in workers' total compensation, suggesting that the mandatory wage rise induced by higher minimum wages is largely offset by firms' response to reduce fringe benefits. The findings are significantly different from many empirical studies for developed countries, which find that the increase of minimum wages has no discernible effect on fringe benefit generosity for low-skilled workers (Simon & Kaestner, 2004).

Table 5
Minimum wage effect by different firm size, industries, and regions (OLS).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Coverage							
Variables	Collective contract	Individual contract	Medical insurance	Pension	Unemployment insurance	Injury insurance	Maternity insurance
Mean of coverage variables	0.26	0.74	0.31	0.35	0.22	0.35	0.16
Interact with large firm dummy							
ln (minimum wage)	0.0679	−0.0819	−0.230**	−0.160	−0.285**	−0.312*	−0.0635
	(0.239)	(0.0927)	(0.107)	(0.102)	(0.104)	(0.162)	(0.135)
ln (minimum wage) * large firm dummy	0.0103	−0.0314	0.0249	−0.0254	0.0321	−0.0238	0.0691
	(0.0708)	(0.0477)	(0.0237)	(0.0218)	(0.0262)	(0.0437)	(0.0437)
Interact with labor intensive industry dummy							
ln (minimum wage)	0.0233	−0.137	−0.231**	−0.223**	−0.315**	−0.277	−0.0248
	(0.247)	(0.115)	(0.110)	(0.0986)	(0.124)	(0.179)	(0.156)
ln (minimum wage) * labor intensive dummy	0.0855	0.0248	−0.0924*	0.00785	−0.0225	−0.0941	−0.0884
	(0.120)	(0.0494)	(0.0523)	(0.0641)	(0.0419)	(0.0861)	(0.0605)
Interact with regional dummies							
ln (minimum wage)	−0.170	−0.0957	−0.197	−0.218**	−0.305***	−0.527***	0.0477
	(0.282)	(0.101)	(0.117)	(0.100)	(0.109)	(0.188)	(0.134)
ln (minimum wage) * east dummy	0.458	0.0803	0.142	0.0638	0.227**	0.607**	0.382**
	(0.375)	(0.0749)	(0.106)	(0.120)	(0.0964)	(0.254)	(0.172)
ln (minimum wage) * central dummy	0.411	−0.0144	−0.0440	0.105	0.0975	0.446	0.0253
Panel B: Per capita payment (in logarithm)							
Variables	Dividend	Wage	Medical insurance	Pension	Unemployment insurance	Injury insurance	Maternity insurance
Mean of per capita variables	0.11	1.52	0.04	0.09	0.01	0.01	0.01
Interact with large firm dummy							
ln (minimum wage)	−2.247	0.439	−1.350	−0.637	−1.067	−0.0989	−0.934
	(1.638)	(0.601)	(0.884)	(0.984)	(0.736)	(1.200)	(0.984)
ln (minimum wage) * large firm dummy	−0.0818	−0.143	−0.240	−0.463*	0.0682	−0.577*	0.280
	(0.399)	(0.145)	(0.200)	(0.257)	(0.124)	(0.311)	(0.216)
Interact with labor intensive industry dummy							
ln (minimum wage)	−1.956	0.254	−2.014*	−1.375	−1.362	−0.327	−1.037
	(1.925)	(0.593)	(1.070)	(0.934)	(0.813)	(1.227)	(1.042)
ln (minimum wage) * labor intensive dummy	−1.079**	0.155	0.00432	0.353	0.0658	−0.163	0.0782
	(0.447)	(0.171)	(0.375)	(0.273)	(0.159)	(0.366)	(0.242)
Interact with regional dummies							
ln (minimum wage)	−0.170	−0.0957	−0.197	−0.218**	−0.305***	−0.527***	0.0477
	(0.282)	(0.101)	(0.117)	(0.100)	(0.109)	(0.188)	(0.134)
ln (minimum wage) * east dummy	0.458	0.0803	0.142	0.0638	0.227**	0.607**	0.382**
	(0.375)	(0.0749)	(0.106)	(0.120)	(0.0964)	(0.254)	(0.172)
ln (minimum wage) * central dummy	0.411	−0.0144	−0.0440	0.105	0.0975	0.446	0.0253
	(0.272)	(0.0995)	(0.115)	(0.122)	(0.118)	(0.271)	(0.128)

Notes: Standard errors are clustered at provincial level and reported in parentheses.
All regressions control for firm and entrepreneur attributes, provincial average wage, as well as industrial, year, and provincial fixed effects.
Variable definition: large firm dummy (a dummy variable taking the value of one if the firm size is above the median firm size in a province, and zero otherwise), labor intensive dummy (a dummy variable taking the value of one if the main sector of the firm is in agriculture, forestry, animal husbandry, fisheries, extractive industries, or manufacturing, and zero otherwise), east dummy (a dummy variable taking the value of one if the firm is located in Beijing, Shanghai, Liaoning, Shandong, Jiangsu, Hebei, Fujian, Zhejiang, Guangdong, Hainan, Tianjin, and zero otherwise), and central dummy (a dummy variable taking the value of one if the firm is located in Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan, and zero otherwise).
Data sources: The firm level data comes from the National Surveys of Privately Owned Enterprises in China in 2004, 2006 and 2008. The minimum wage data are obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007.
* $p = 0.1$.
** $p = 0.05$.
*** $p = 0.01$.

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To explore how minimum wage effects vary in firm size, sector, and region, we construct a dummy variable for large firm (taking value one if the firm size is above the median firm size in a province, and zero otherwise), a dummy variable for labor intensive industries (taking value one if the main sector of the firm is in agriculture, forestry, animal husbandry, fisheries, extractive industries, or manufacturing, and zero otherwise), and three regional dummy variables (east, central, and west).

In Table 5, we present the regression results when controlling for the interactions between these dummy variables and minimum wage as covariates, again for coverage and per capita payment of benefits, respectively. We find that the negative impact on fringe benefits is more pronounced in large firms where the employers tend to have more bargaining power, in industries sensitive to labor cost, and in less prosperous western region with weaker legal protection for workers. These results are consistent with predictions from economic theory, which would imply more adjustment in worker benefits in response to minimum wage regulation where the adjustment is less costly and labor cost is more important. The results in Table 5 thus provide additional evidence for the negative impact of minimum wage regulation.

5.2. Effect of minimum wage on employment

In this subsection, we explore how firms alter the number of workers employed and the mix of employees with different terms of labor contracts and skill levels. Specifically, we use two indicators to measure employment size and its adjustment: the number of employees in a firm and the growth rate of firm employment; for measuring employment structure, we use the percentage of workers hired from laid-off or rural migrant workers, the percentage of workers with 1 to 6 month labor contract, the percentage of workers with 6 to 12 month labor contract, and the percentage of workers with 1 to 12 month labor contract.

Table 6 reports the results. Consistent with many studies on the employment effect, we find that firms respond to higher minimum wages by laying off low skilled and short-term workers. As shown in Panel A and Panel B, a 10% increase in minimum wages will reduce the proportion of laid-off or rural migrant workers by 2.3%, and reduce the proportion of workers with 1 to 6 month labor contract by 6.75%. Consistent with previous findings on compensation, Panel C shows that minimum wages are less likely to affect the employment of firms whose average wages are far above the minimum wage.

Table 7 shows how the adverse employment effects vary across firms of different size, sectors, and regions. For large firms, we find that minimum wage has a larger effect on the size of employment but a smaller effect on the structure of workers. This may reflect the greater flexibility of large firm in adjusting its employment size. As expected, we find that labor intensive industries are more responsive to minimum wage increases by laying off short term workers. And consistent with the findings of Fang and Lin Q27

Table 6
Minimum wage and employment (OLS).

Variables	(1) ln (employment)	(2) Employment growth rate	(3) Laid off & rural migrant worker percentage	(5) 1–6 months worker percentage	(4) 6–12 months worker percentage	(6) 1–12 months worker percentage
Mean	4.12	0.13	0.62	0.13	0.21	0.28
			Panel A: Full sample			
ln (minimum wage)	−0.00728	−0.0168	−0.230**, ***	−0.188	−0.209	−0.265
	(0.0653)	(0.0784)	(0.129)	(0.135)	(0.135)	(0.249)
Observations	3996	2422	1799	2546	2780	2391
R-squared	0.956	0.043	0.177	0.123	0.109	0.161
			Panel B: Minimum wage − 1000 ≤ wage ≤ minimum wage + 1000			
ln (minimum wage)	0.401	−0.0522	−0.116	−0.675*	−0.584	−0.437
	(1.230)	(0.0463)	(0.104)	(0.396)	(0.550)	(0.883)
Observations	263	112	93	170	187	161
R-squared	0.648	0.327	0.426	0.252	0.296	0.309
			Panel C: Minimum wage > minimum wage + 1000			
ln (minimum wage)	−0.286	−0.0264	−0.0628	−0.147	−0.0840	−0.141
	(0.327)	(0.0218)	(0.0485)	(0.134)	(0.148)	(0.252)
Observations	3347	2168	1615	2301	2106	1970
R-squared	0.522	0.026	0.160	0.128	0.143	0.190
Notes on all panels						
Firm and entrepreneur attributes	Yes	Yes	Yes	Yes	Yes	Yes
Province, sector, and year dummies	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors are clustered at provincial level and reported in parentheses.
All regressions control for firm and entrepreneur attributes, provincial average wage, as well as industrial, year, and provincial fixed effects.
Data sources: The firm level data comes from the National Surveys of Privately Owned Enterprises in China in 2004, 2006 and 2008. The minimum wage data are obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007.
* $p = 0.1$.
** $p = 0.05$.
*** $p = 0.01$.

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Table 7
Minimum wage and employment by different firm size, industries, and regions (OLS).

Variables	(1) ln (employment)	(2) Employment growth rate	(3) Laid-off & rural migrant worker percentage	(4) 1–6 months worker percentage	(5) 6–12 months worker percentage	(6) 1–12 months worker percentage
Mean	4.12	0.13	0.62	0.13	0.21	0.28
Panel A: Interact with large firm dummy						
ln (minimum wage)	0.0833	−0.00469	−0.198	−0.236*	−0.229	−0.332
	(0.0683)	(0.0741)	(0.120)	(0.128)	(0.140)	(0.249)
ln (minimum wage) * large firm dummy	−0.154**	−0.0169	−0.0532**	0.0390	0.0626**	0.0979**
	(0.0565)	(0.0294)	(0.0220)	(0.0250)	(0.0273)	(0.0360)
Panel B: Interact with labor intensive industry dummy						
ln (minimum wage)	0.0262	−0.0146	−0.216	−0.120	−0.181	−0.159
	(0.0713)	(0.0735)	(0.151)	(0.125)	(0.139)	(0.255)
ln (minimum wage) * labor intensive dummy	−0.0522	−0.00687	−0.0315	−0.112***	−0.0270	−0.0796*
	(0.0312)	(0.0270)	(0.0332)	(0.0290)	(0.0254)	(0.0410)
Panel C: Interact with regional dummies						
ln (minimum wage)	0.0404	0.153*	−0.204	−0.169	−0.226	−0.167
	(0.0776)	(0.0826)	(0.182)	(0.126)	(0.147)	(0.246)
ln (minimum wage) * east dummy	−0.0481	−0.205***	−0.0998	0.0136	0.112	0.167
	(0.0874)	(0.0576)	(0.159)	(0.103)	(0.103)	(0.147)
ln (minimum wage) * central dummy	−0.105	−0.228**	0.0815	−0.0938	0.0706	−0.234
	(0.0877)	(0.0962)	(0.173)	(0.124)	(0.0970)	(0.172)
Notes on all panels						
Provincial average wage	Yes	Yes	Yes	Yes	Yes	Yes
Firm and entrepreneur attributes	Yes	Yes	Yes	Yes	Yes	Yes
Province, sector, and year dummies	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors are clustered at provincial level and reported in parentheses.
All regressions control for firm and entrepreneur attributes, provincial average wage, as well as industrial, year, and provincial fixed effects.
Variable definition: large firm dummy (a dummy variable taking the value of one if the firm size is above the median firm size in a province, and zero otherwise), labor intensive dummy (a dummy variable taking the value of one if the main sector of the firm is in agriculture, forestry, animal husbandry, fisheries, extractive industries, or manufacturing, and zero otherwise), east dummy (a dummy variable taking the value of one if the firm is located in Beijing, Shanghai, Liaoning, Shandong, Jiangsu, Hebei, Fujian, Zhejiang, Guangdong, Hainan, Tianjin, and zero otherwise), and central dummy (a dummy variable taking the value of one if the firm is located in Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan, and zero otherwise).
Data sources: The firm level data comes from the National Surveys of Privately Owned Enterprises in China in 2004, 2006 and 2008. The minimum wage data are obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007.
* $p = 0.1$.
** $p = 0.05$.
*** $p = 0.01$.

(2013), we find that minimum wage changes have significantly negative effects on the employment of firms in more prosperous central and eastern parts of China where the labor market functions better.

5.3. Effect of minimum wage on firm performance

As rigidities in the labor market induced by minimum wage regulation may not only contribute to unemployment, but also hurt firms by reducing their flexibility of wage adjustment (Almeida & Carneiro, 2005), we expect that minimum wages will negatively affect firm performance (Autor, Kerr, & Kugler, 2007; Bird & Knopf, 2009). Moreover, the detrimental effect will be especially strong when the economy is in recession or hit by negative demand shocks, with minimum wage regulation restricting firms from cutting labor cost via lower wages. In fact, when China was hit by the global financial crisis in 2008, the Department of Human Resources and Social Security instructed local governments to restrain from increasing minimum wages in 2009 to help support labor intensive industries.[16]

To explore whether firms can fully offset the negative effects of minimum wages under different market conditions, we construct an annual external demand shock measure for each province in China using Chinese customs data and world trade data. The computation takes several steps: We start with the percentage of the province's export volume accounted by a certain good in the previous year and multiply it by the total import of the good in the current year from the rest of the world, which defines the potential market for the province's export in the good. Subtracting the potential market for the previous year from

[16] See the news form Xinhua net: http://news.xinhuanet.com/newscenter/2008-11/17/content_10372567_1.htm.

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Table 8
Minimum wage and firm profitability (OLS).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Full sample		Subsample with export > 0		Full sample		
Variables	ROE	ROE	ROE	ROE	1–6 months worker percent	6–12 months worker percent	1–12 months worker percent
Mean	0.26	0.26	0.26	0.26	0.13	0.21	0.28
Panel A: Dividing demand shock by median							
ln (minimum wage)	−0.241	−0.0706	−1.677	−1.087	−0.245	−0.0359	−0.0606
	(0.675)	(0.665)	(1.659)	(1.712)	(0.212)	(0.132)	(0.260)
Shock below median	−0.199	−0.607***	−0.478**	−1.431***	−0.142***	−0.162***	−0.257***
	(0.123)	(0.195)	(0.202)	(0.338)	(0.0468)	(0.0542)	(0.0728)
ln (minimum wage) * shock below median		−0.615**		−1.509**	−0.218**	−0.196***	−0.318***
		(0.249)		(0.579)	(0.0858)	(0.0680)	(0.111)
Observations	2614	2614	1691	1691	1958	1767	1650
R-squared	0.100	0.127	0.134	0.168	0.126	0.156	0.215
Panel B: Dividing demand shock by 30th and 70th centiles							
ln (minimum wage)	0.358	0.141	0.155	−0.213	−0.165	−0.0706	0.0359
	(0.233)	(0.412)	(0.429)	(0.660)	(0.216)	(0.161)	(0.290)
Shock below 30th centiles	0.0545	−0.0942	0.0731	−0.165*	−0.124**	−0.316***	−0.165*
	(0.0372)	(0.267)	(0.103)	(0.0865)	(0.0545)	(0.114)	(0.0865)
Shock above 70th centiles	0.0229	0.184	0.0849	0.0760*	0.0334	0.0720	0.0760*
	(0.0463)	(0.198)	(0.0711)	(0.0376)	(0.0811)	(0.0802)	(0.0376)
ln (minimum wage) * shock below 30th centiles		−0.0830		−0.853*	−0.265***	−0.227*	−0.456***
		(0.295)		(0.474)	(0.0763)	(0.126)	(0.157)
ln (minimum wage) * shock above 70th centiles		0.221		0.424	−0.0303	0.0758	0.0233
		(0.217)		(0.276)	(0.108)	(0.0544)	(0.102)
Observations	2614	2614	1691	1691	1958	1767	1650
R-squared	0.175	0.173	0.200	0.205	0.125	0.156	0.214
Notes on all panels							
Firm and entrepreneur attributes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Provincial average wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province, sector, and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors are clustered at provincial level and reported in parentheses.
All regressions control for firm and entrepreneur attributes, provincial average wage, as well as industrial, year, and provincial fixed effects.
Variable definition: ROE (return on equity), shock below median (a dummy variable taking the value of one if the provincial external demand shock is below the yearly median, and zero otherwise), shock below 30th centiles (a dummy variable taking the value of one if the provincial external demand shock is below the 30th centiles of each year, and zero otherwise), and shock above 70th centiles (a dummy variable taking the value of one if the provincial external demand shock is above the 70th centiles of each year, and zero otherwise).
Data sources: The firm level data comes from the National Surveys of Privately Owned Enterprises in China in 2004, 2006 and 2008. The minimum wage data are obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007. The external demand shock measure for each province is constructed by busing Chinese customs data and world trade data.
* $p = 0.1$.
** $p = 0.05$.
*** $p = 0.01$.

that for the current year gives the hypothetical change in this good. We then repeat the process for all goods and sum up all the hypothetical changes to obtain the annual external demand shock for each province in China.

As the changes in each good's export volume are determined by the worldwide demand and export compositions vary substantially across provinces, the changes in external demand shocks thus provide us with an exogenous source of variation, which can help us identify the minimum wage effects. To distinguish the different effects of minimum wages under different types of demand shocks, we divide the shocks into several categories by centiles and construct the corresponding dummy variables, first categorizing the shocks into two types by the yearly median, and then dividing them into three types by the 30th centiles and 70th centiles of each year.

The regression results are reported in Table 8. We find that firm profitability is negatively associated with the level of minimum wage but the effect is not statistically significant without the interaction term between minimum wage and adverse demand shock. This seems to suggest that firms might be able to fully offset the cost increase introduced by the minimum wage in the absence of external shock, most likely because minimum wage increases do not surpass market wage rate adjustments during periods of economic expansion. Different from the earlier studies by Draca et al. (2011), we find that minimum wage has an asymmetric effect on firm performance, with the detrimental effect being significant only under adverse market conditions. As presented in Table 8, the interaction terms between minimum wage and lower centile demand shocks have negative and significant effects for firm profitability. And as expected, the detrimental effect is more pronounced on firms that rely

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t9.1 **Table 9**
t9.2 Minimum wage and lagged provincial average benefits level (OLS).

t9.3		(1)	(2)	(3)	(4)	(5)	(6)	(7)
t9.4		Dependent variable: ln (minimum wage) for period t + 1						
t9.5	*Panel A: Provincial level coverage indicators*							
t9.6		0.156	−0.0857	0.147	−0.116	−0.113	0.503** ***	0.694*
t9.7		(0.238)	(0.157)	(0.311)	(0.194)	(0.249)	(0.192)	(0.384)
t9.8	Observations	29	58	58	58	58	29	29
t9.9	*R*-squared	0.458	0.930	0.930	0.930	0.930	0.567	0.512
t9.10								
t9.11	*Panel B: Provincial level payment indicators*							
t9.12		0.257*	−0.0372	0.0109	−0.0125	0.0282	0.0671*	0.0214
t9.13		(0.135)	(0.0345)	(0.0277)	(0.0293)	(0.0229)	(0.0391)	(0.0230)
t9.14	Observations	29	27	57	58	55	29	24
t9.15	*R*-squared	0.520	0.491	0.930	0.930	0.5471	0.506	0.482

t9.16 All of the regression control for GDP per capita and fixed effects.
t9.17 For Panel A, rows 1 to 7 present the regression coefficients of the provincial coverage of collective contract, individual contract, medical insurance average, pension
t9.18 average, unemployment insurance average, injury insurance average, and maternity insurance average, respectively.
t9.19 For Panel B, rows 1 to 7 present the regression coefficients of the provincial average wage, dividend, medical insurance, pension, unemployment insurance, injury
t9.20 insurance, and maternity insurance, respectively.
t9.21 Data sources: The firm level data comes from the National Surveys of Privately Owned Enterprises in China in 2004, 2006 and 2008. The minimum wage data are
t9.22 obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007.
t9.23 * $p = 0.1$.
t9.24 ** $p = 0.05$.
t Q3 *** $p = 0.01$.

more on export. These findings are consistent with the hypothesis that minimum wage hurts firm profitability by reducing the flexibility in wage adjustment under adverse demand shocks. As presented in columns 4–7, when encountering an adverse demand shock, firms could lay off more temporary workers who would potentially have been employed if wage could adjust flexibly.

5.4. Endogeneity and robustness checks

Given that our data are a repeated cross-section, where different firms are included in the sample in 2004, 2006, and 2008, the main source of variation comes from the regional difference in minimum wage, and thus the current study may be subject to the issue of endogeneity as compared to a panel data set. But for several reasons, the potential endogeneity issue has been mitigated. First, we have included industry, year, and province dummies to capture the unobserved fixed effects and thus the endogeneity problem caused by omitting these fixed effects should be less of a concern. Second, omitted variables such as the level of economic development, the strength of protection for labor, and the enforcement of law are more likely to correlate positively with fringe benefits as well as minimum wage rates. For example, rich areas are more likely to have higher minimum wage rates and provide better fringe benefits for workers. Omitting these variables will lead us to attribute all the impact to minimum wage rate and thus bias upward our estimates on the impact of minimum wages on fringe benefits, thus our estimates are potentially upper bounds for the effects of minimum wages on fringe benefits, lending more credibility to the observed negative effects.

As another example, since raising the standard of minimum wages tends to reduce employment, local governments may only increase minimum wages when employment is likely to grow, again causing potential endogeneity in our estimation. But since local governments' behaviors described above should result in a positive relationship between employment growth and minimum wages, our finding of a negative association between the growth of firm employment and the minimum wage increases is especially strong evidence for the dampening effect of minimum wage increases on employment.

Nonetheless, our results may still suffer from potential reverse causality if instead of adjusting according to regional cost of living, local governments are motivated to raise minimum wages to compensate for lower worker benefits. This could account for the findings we have presented. To address this potential reverse causality, we regress the current minimum wage on provincial averages of benefit indicators from the previous year and report our results in Table 9, where Panel A focuses on the coverage of benefits and Panel B includes per capita payment results. We do not find any evidence that the current level of minimum wage is negatively correlated with prior local labor conditions.

Another possible concern is simultaneity resulting from the founding of new firms. If regions with low minimum wages tend to attract more new firms and at the same time new firms tend to provide better benefits to their workers, then we would observe the negative correlation between minimum wage rates and benefit levels presented above. To address this possibility, we perform the robustness check of excluding firms established after 2003, which is the year for the first round of survey in our data. As very few firms have changed their headquarters, excluding the firms that were established during our sample period thus allows us to compare the responses of firms to minimum wage regulations in different areas when their locations are predetermined. We find our results to be robust (see Table 10).

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Table 10
Robustness checks excluding new firms (OLS).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Coverage							
Variables	Collective contract	Individual contract	Medical insurance	Pension	Unemployment insurance	Injury insurance	Maternity insurance
Mean of coverage variables	0.26	0.74	0.31	0.35	0.22	0.35	0.16
Wage < minimum wage − 1000							
ln (minimum wage)	−1.985*	−0.552	0.114	1.319	0.424	−0.813	0.109
	(1.018)	(1.417)	(0.717)	(0.887)	(0.629)	(0.548)	(0.352)
Minimum wage − 1000 ≤ wage ≤ minimum wage + 1000							
ln (minimum wage)	−1.159	−0.454	−0.102	1.155	0.124	−1.028**	0.0880
	(1.147)	(1.180)	(0.705)	(0.828)	(0.596)	(0.403)	(0.469)
Minimum wage − 2000 ≤ wage ≤ minimum wage + 2000							
ln (minimum wage)	−4.912***	−1.942	−1.342	−0.567	−1.145	−1.379**	0.0342
	(1.022)	(1.357)	(0.795)	(0.604)	(0.734)	(0.515)	(0.500)
Wage > minimum wage + 2000							
ln (minimum wage)	0.120	−0.0856	−0.105	−0.0598	−0.141	−0.202	−0.109
	(0.381)	(0.140)	(0.128)	(0.104)	(0.138)	(0.264)	(0.223)

Panel B: Per capita payment (in logarithm)

Variables	Dividend	Wage	Medical insurance	Pension	Unemployment insurance	Injury insurance	Maternity insurance
Mean of per capita variables	0.11	1.52	0.04	0.09	0.01	0.01	0.01
Wage < minimum wage − 1000							
ln (minimum wage)	1.593	0.508	−8.067	−1.088	−0.106	−9.734**	−2.316
	(11.07)	(1.201)	(5.989)	(7.085)	(3.770)	(4.586)	(1.409)
Minimum wage − 1000 ≤ wage ≤ minimum wage + 1000							
ln (minimum wage)	3.343	0.953***	−10.37*	−1.885	−1.106	−11.62***	−2.764
	(11.62)	(0.270)	(5.809)	(5.797)	(5.048)	(4.018)	(2.445)
Minimum wage − 2000 ≤ wage ≤ minimum wage + 2000							
ln (minimum wage)	5.751	0.962***	−28.63***	−13.49	−10.89	−10.68	−4.867
	(9.867)	(0.173)	(4.894)	(9.273)	(8.279)	(7.396)	(3.085)
Wage > minimum wage + 2000							
ln (minimum wage)	−3.510	0.721	−1.280	−1.097	−1.538	0.580	−1.624
	(2.427)	(0.506)	(1.159)	(0.996)	(0.940)	(2.334)	(1.712)

Notes: Standard errors are clustered at provincial level and reported in parentheses.
All regressions control for firm and entrepreneur attributes, provincial average wage, as well as industrial, year, and provincial fixed effects.
Data sources: The firm level data comes from the National Surveys of Privately Owned Enterprises in China in 2004, 2006 and 2008. The minimum wage data are obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007.
* $p = 0.1$.
** $p = 0.05$.
*** $p = 0.01$.

6. Conclusion

Many developing countries have established minimum wage legislations in order to redistribute income to low wage workers, yet few studies have examined the mechanisms through which employers adjust to minimum wages in the context of developing countries where offsetting behaviors may be a concern under weak labor protection institutions.

This paper adds to the literature by empirically exploring how private firms respond to minimum wage regulations in China. Overall, the minimum wage effects are broadly consistent with the theoretical expectations and institutional features of Chinese labor markets. We find that the affected firms actively pursue to offset wage rises mandated by minimum wage regulation in several ways. They reduce expenditures on various fringe benefits including pension and insurance programs, and they realign the marginal product of labor with wages by laying off workers with low skills and short term labor contracts. Despite these offsetting behaviors, however, we find that firms still fail to fully mitigate the detrimental effects of minimum wage requirement on profitability under adverse external demand shocks due to the wage rigidity introduced by minimum wage regulation.

While this study is the first step to explore the potential mechanisms and strategies that employers adopted to cope with minimum wage increases, it sheds light on a variety of issues. First, it highlights the unintended consequences of minimum wage regulation in the private sector in China by using a national wide firm-level data. The findings we made in this study will provide important insights into the impact and enforcement of minimum wages in China as well as in other developing countries and emerging markets. Second, the empirical evidence presented here also helps to explain the small effect of minimum wages on employment observed in previous literature. We find that the cost introduced by minimum wage increases can be largely

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mitigated by reductions in various fringe benefits. Third, our findings suggest that minimum wage legislation may not be an effective way to alleviate poverty due to firms' offsetting behaviors in developing countries like China. It is thus important to take into account the coping strategies when studying the impacts of minimum wage in developing countries.

Uncited references

Q28

Arulampalam, W., et al., 2004
Jia, P. and Zhang, S., 2020

Appendix A

Table A
Robustness checks for alternative divisions of wage distribution (OLS).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Coverage							
Variables	Collective contract	Individual contract	Medical insurance	Pension	Unemployment insurance	Injury insurance	Maternity insurance
Mean of coverage variables	0.26	0.74	0.31	0.35	0.22	0.35	0.16
*Wage < minimum wage * 0.9*							
ln (minimum wage)	−0.656	−0.441	−0.197	0.559	0.241	−0.459	0.140
	(0.745)	(1.045)	(0.332)	(0.581)	(0.491)	(0.502)	(0.264)
*Minimum wage * 0.9 ≤ wage ≤ minimum wage * 1.1*							
ln (minimum wage)	0.172	−0.212	−0.355	0.572	0.0277	−0.536	−0.0902
	(0.941)	(0.901)	(0.416)	(0.503)	(0.472)	(0.411)	(0.404)
*Wage > minimum wage * 1.1*							
ln (minimum wage)	−0.0505	−0.0619	−0.176	−0.109	−0.236*	−0.232	−0.0378
	(0.274)	(0.127)	(0.111)	(0.0976)	(0.124)	(0.190)	(0.172)
Wage > minimum wage + 2000							
ln (minimum wage)	0.120	−0.0856	−0.105	−0.0598	−0.141	−0.202	−0.109
	(0.381)	(0.140)	(0.128)	(0.104)	(0.138)	(0.264)	(0.223)

Panel B: Per capita payment (in logarithm)							
Variables	Dividend	Wage	Medical insurance	Pension	Unemployment insurance	Injury insurance	Maternity insurance
Mean of per capita variables	0.11	1.52	0.04	0.09	0.01	0.01	0.01
*Wage < minimum wage * 0.9*							
ln (minimum wage)	−2.659	0.245	−7.446*	−1.981	−1.998	−4.613	−0.936
	(6.632)	(0.657)	(3.817)	(4.236)	(2.757)	(2.938)	(1.445)
*Minimum wage * 0.9 ≤ wage ≤ minimum wage * 1.1*							
ln (minimum wage)	0.177	1.231***	−9.349**	−2.411	−3.366	−6.416**	−2.068
	(6.849)	(0.107)	(3.615)	(3.742)	(3.082)	(3.062)	(1.900)
*Wage > minimum wage * 1.1*							
ln (minimum wage)	−2.575	0.638*	−1.247	−0.659	−1.746*	−0.162	−1.700
	(1.558)	(0.338)	(0.951)	(0.950)	(0.880)	(1.655)	(1.208)

Notes: Standard errors are clustered at provincial level and reported in parentheses.
All regressions control for firm and entrepreneur attributes, provincial average wage, as well as industrial, year, and provincial fixed effects.
Data sources: The firm level data comes from the National Surveys of Privately Owned Enterprises in China in 2004, 2006 and 2008. The minimum wage data are obtained from local government bulletins and websites of the Department of Human Resources and Social Security for 31 provinces in 2003, 2005, and 2007.
* $p = 0.1$.
** $p = 0.05$.
*** $p = 0.01$.

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