

# Minimum Wages and Employment in China

Tony Fang<sup>\*</sup> and Carl Lin<sup>†</sup>

## Abstract

The paper uses a panel data at the county level which contains relevant information on minimum wages combined with a longitudinal household survey of 16 representative provinces to estimate the employment effect of minimum wage changes in China over 2004 to 2009 period. After the new minimum wage regulations were promulgated in 2004, the magnitude and frequency of minimum wage changes have been substantial and high both over time and across different jurisdictions. In contrast to the mixed results of previous studies that use provincial level data, we present evidence that minimum wage changes have significant effects on the employment of more prosperous Eastern of China, and result in disemployment on females, young adults and less-skilled workers.

*Keywords:* Minimum Wage, China, Employment

*JEL Classifications:* J38

---

<sup>\*</sup> Tony Fang is an Associate Professor of Human Resource Management & Employment Relations at Monash University and a Research Fellow of Institute for the Study of Labor (IZA).

<sup>†</sup> Carl Lin is an Assistant Professor at the School of Economics and Business Administration of Beijing Normal University and a Research Fellow of Institute for the Study of Labor (IZA).

Correspondence: No.19 Xijiekou Outer St., Haidian Dist., Beijing, P.R. China. Tel: +86-188-106-33343; Fax: +86-105-880-1867; E-mail: [csmlin@bnu.edu.cn](mailto:csmlin@bnu.edu.cn).

## I. INTRODUCTION

Since China issued its new minimum wage regulations in 2004, the minimum wage has sparked intense debate in the country. There is little doubt that employees generally welcome the minimum wage. However, there is much less agreement about whether the minimum wage is effective at attaining its goals. The issue, from the time of its introduction, has been highly controversial with the public opinion as well as within the academia.

Proponents of minimum wages advocate them as a way to assist individuals or families to achieve self-sufficiency, protecting workers in low-paid occupations from the grimmest aspects of labor markets (Zhang and Deng 2005; Sun 2006). Furthermore, minimum wages can help reduce inequality and serve as an important safety net by providing a minimum floor on wages (Zhang 2007; Jia and Zhang 2013). In addition, the higher labor cost may foster managerial efficiency and labor productivity, inducing employers to move up the value-added chain and invest in productivity improving technology (Cooke 2005). Along these lines, Chinese scholars have often argued in favor of the more proactive use of minimum wages, which they regard as otherwise too low and ineffective (Du and Wang 2008; Ding 2009; Han and Wei 2011).

In contrast, opponents of minimum wages argue that they reduce China's comparative advantage based on an abundance of low-wage labor and undermine enterprise's dividend policy, which result in joblessness among blue-collar workers (Cheung 2004, 2010). Opponents reiterate the basic arguments against the minimum wage regulation in that it will reduce the employment opportunities of low-wage labor and also lead to offsets in such forms as reductions in other elements of the compensation package (Xue 2004). Furthermore, rural-urban workers tend to have very low pay and they likely accept jobs which pay less than the minimum wage, making it exist in name only (Chan 2001; Ye 2005). Raising minimum wages increases the

labor cost, in turn, can jeopardize the employment and welfare of low-wage workers (Ping 2005; Gong 2009).

The contentiousness of the minimum wage in news articles and scholarly work does not allow for its impact to be easily understood. However, the initial evidence seems to show that the magnitude and frequency of minimum wage changes have been substantial both over time and across different jurisdictions, especially after year 2003. For example, in January 2004, China promulgated the new minimum wages regulations which required local governments should renew the minimum wage standards at least once every two years, extended coverage to employees in self-employed business and to part-time workers, and quintupled the penalties of violation or noncompliance. The new regulations were put into effect in March 2004, leading to frequent and substantial increases in minimum wages in the subsequent years.

[Figure 1 about here]

Figure 1 shows the nominal and real minimum wage (monthly average) in China from 1995 to 2012, as well as the number of provinces that raised the minimum wage standards in each year and its moving average over the same period. Between 1995 and 2003, the nominal minimum wage increased steadily from 169 RMB to 301 RMB, implying a 78 percent growth in 9 years. However, since China issued the new minimum wages regulations in 2004, the nominal minimum wage had increased by more than 200 percent and grown rapidly to 944 RMB in 2012. Looking at the real minimum wage, it grew relatively slow before 2004 and seemed to begin rising after that year. Furthermore, as shown by the moving average curve in Figure 1, there is an apparent shift in the number of provinces that raised the minimum wage standards in 2004, indicating that the minimum wage adjustment had become more frequent since that year.

How had this phenomenon affected the labor market outcomes in China? Specifically, do changes in the minimum wage standards have an impact on the employment in the Chinese labor market? Despite an enormous literature documenting numerous aspects of minimum wages and their role in the labor market, the magnitude of an “average” effect of minimum wages on employment does not reach a consensus, however.

Empirically, there are at least three challenges involved in measuring the effect. First, because provinces and municipalities in China have considerable flexibility in setting their minimum wage according to local conditions, often, there are at least 3 or 4 levels of minimum wage standards applying to different counties in most provinces, meaning that county- or city-level minimum wage data containing the relevant information on the dates and the extent of minimum wage increase are not readily available.<sup>1</sup> Second, omitted variables and endogeneity issue (such as decision on the adjustment of minimum wage standards) make it difficult to separate causal effects from other unobserved confounding factors. Third, it is difficult to find microdata that can also be plausibly representative of the population that are directly influenced by the minimum wage. Besides, some provinces such as Beijing and Shanghai do not include social security payments and housing provident funds as part of the wage when calculating minimum wages—a fact that had made their “official” minimum wage virtually higher.<sup>2</sup>

---

<sup>1</sup> The implementation date of a new minimum wage standard of a county can also differ to that of its geographically contiguous neighbors within the same province. For example, Liaoning Province has the most complicated minimum wage system in which 14 jurisdictions may carry out their own standards on different dates. Take year 2007 for instance, Shenyang, Benxi, Dandong, Panjin city did not increase their minimum wages; Dalian and Anshan city increased from 600RMB to 700RMB on December 20th while Jinzhou and Liaoyang city increased from 480RMB to 580RMB, Chaoyang city increased from 350RMB to 530RMB on the same day; Fushun and Huludao city increased from 400RMB to 480RMB on January 1st while Yingkou city increased from 380RMB to 480RMB, Fuxin city increased from 350RMB to 420RMB and Tieling city increased from 380RMB to 420RMB.

<sup>2</sup> In other words, with or without accounting for this issue, the difference can be substantial. For instance, the mean monthly minimum wages in Beijing and Shanghai are 651RMB and 767RMB in 2004-2009; however, the average expenses of both social security payments and housing provident funds in Beijing and Shanghai are as high as 376RMB and 452RMB over the same period, amounting to 58 percent and 59 percent of the nominal minimum wages for Beijing and Shanghai, respectively. We discuss how we address this issue in Section III.A.

In the paper, we first assess the extent to which the phenomenon in Figure 1 had an impact on the Chinese labor market by measuring an average effect of minimum wage on the employment. To do so, we begin analyzing the labor market reaction to changes in minimum wage standards using panel data regressions. The most distinctive feature of our data—crucial for our research design—is the large county-level panel that is the universe of all counties in China which contains relevant information on minimum wages combined with a longitudinal household survey of 16 representative provinces between 2002 and 2009. The use of county data provides a reasonable representation and more variation in detecting the effects of minimum wages on employment in China. In particular, this feature allows us to directly evaluate the effects on the subgroups of the population, especially those who are at-risk of being affected by a minimum wage increase such as young adults, low-skilled workers and rural migrants.

Our panel data regressions reveal significant disemployment effects of minimum wages on female young adults between 2004 and 2009—a 10 percent increase in the minimum wage led to a statistically significant 1.5 percent reduction in employment. In contrast, we do not find significant effects on males in every age cohort. Furthermore, we find that the minimum wage has the largest adverse effect on the employment of at-risk group (defined as workers whose monthly wages are between the old and new minimum wage standards), showing that elasticities are in the range of -0.21 to -0.34 over the same period.

To further substantiate our findings, we re-estimate the effects for 3 different time periods—pre-2004, 2004-2007 and 2008-2009 (the global financial crisis period)—by viewing the promulgation of new minimum wage regulations in 2004 as a quasi-experiment. The evidence supporting our panel data regression estimates is compelling: we find that minimum wages have adverse employment effects on both young adults and at-risk group in the post-2004 period,

indicating a 10 percent increase in the minimum wage led to a statistically significant 3.6 percent reduction in the employment of at-risk group during 2004-2007 and 1.0 percent reduction for young adults in the 2008-2009 period. On the contrary, we do not find a significant effect in the pre-2004 period.

Several studies on the employment effects of minimum wages in China find mixed results, and in particular the results by regions are the opposite of each other. For example, Ni, Wang, and Yao (2011) focus on all employees and find some negative effects in the more prosperous and rapidly growing East and some positive effects in the developing Central and less developed Western regions over the 2000-2005 period; in contrast, Wang and Gunderson (2011) use 2000-2007 data on rural migrants, finding no adverse but a positive employment effect in state-owned enterprises in the East and negative effects in Central and Western regions. The discrepancies between these studies may be explained in part by the fact that the employment effects on different target groups tend to differ. Indeed, by examining the effects on several subgroups, our estimates seem to reconcile the results of previous studies—we find that, similar to Ni, Wang, and Yao (2011), the minimum wage has a significantly negative effect on all employees in the East and a lagged positive effect (though statistically insignificant) in Western region in 2004-2009; on the contrary, using rural migrants as the target group, we find that the minimum wage has an adverse and significant effect in the West and a positive effect (though statistically insignificant) in Eastern region over the same period as found in Wang and Gunderson (2011).

Finally, we investigate the impact of the minimum wage on the employment of workers of different skills. In theory, less-skilled workers are relatively vulnerable when facing minimum wage increases. As anticipated, our panel data regression results show that the minimum wage has an adverse, though perhaps mild, effect on the employment of less-skilled workers (defined

as high school graduates or below), a 10 percent increase in the minimum wage results in a statistically significant 0.7 to 0.8 percent reduction in employment for the entire sample, 0.7 percent for the eastern region and 0.5 to 0.7 percent for the central region, respectively. In contrast, we do not find a statistically significant effect for the western region and for those workers who have at least a college degree.

The remainder of the paper is organized as follows. We provide a review of the development of minimum wages in China in Section II. Section III describes some details pertaining to the data, which we provide along with the research design of the paper. In Section IV we present and discuss the empirical results. Section V concludes the paper.

## **II. MINIMUM WAGES IN CHINA**

Prior to 1994, China had no minimum wage law. In 1984, the country simply acknowledged the “Minimum Wage Treaty” of the International Labour Organization (ILO) in 1928 (Wang and Gunderson 2011). It was not until Zhuhai of Guangdong Province first implemented its local minimum wage regulations then followed by Shenzhen, Guangzhou and Jiangmen in 1989, had the central government of China begun to consider the legislation of minimum wages. In 1993, China issued its first minimum wage regulations, and in July 1994, they were written into China’s new version of the Labor Law.

The 1994 legislation required that all enterprises should comply with paying local minimum wages and that local governments should set the minimum wage according to five principles all related to local conditions. Specifically, the local minimum wage was to pay attention to local average wages, productivity, unemployment, economic development, and minimum living expenses. These conditions provided considerable flexibility for provinces and cities in setting their minimum wage, with the economic development principle giving them the flexibility to restrain minimum wages to attract foreign investment.

By the end of 1995, 24 provinces and municipalities had set their own minimum wages. In February 2004, new regulations were promulgated, the main features of which involved extending coverage to town—village enterprises to employees in self-employed business and to non-fulltime workers. Importantly, penalties for violation were increased from an earlier range of 20 percent to 100 percent of the wage that was owed to a new range of 100 percent to 500 percent of the owed wage. Employers were not to include subsidies such as overtime pay or canteen and traveling supplements as part of the wage when calculating minimum wages. The new regulations were put into effect in April 2004 and led to substantial increases in minimum wages. Minimum wages are also part of the Law of the People’s Republic of China on Employment Contracts which took effect on May 1, 2008. There are five Articles in this new law mentioning minimum wages. For example, Article 20 says that the wage in any probationary period should not be lower than the local minimum wage.

### **III. DATA AND RESEARCH DESIGN**

The data collection and research design were motivated by the desire to estimate the average effect of minimum wages on employment and to attempt to address some of the aforementioned challenges. In collecting the data, the goal was to obtain information on the minimum wage at the county- or city-level over a long time span, with a panel structure allowing for the use of time and county fixed effects to eliminate omitted variable bias arising both from unobserved variables that are constant over time and from unobserved variables that are constant across counties. The wage sample needed to be a longitudinal microdata to allow for the distribution of minimum wage workers—in each geographic region, age cohort, skill level and industry—to be estimated. For these reasons, and because the paper also aimed to examine how the 2008 global



financial crisis could influence our results, we sought to collect information on potentially affected provinces over as many years as possible.

#### A. Data

Our study primarily use two sources of data: the annual Urban Household Survey (UHS) from 2002 to 2009 and minimum wages data collected at the county level between 1994 and 2012. The UHS is a continuous, large scale social-economic survey conducted by the National Bureau of Statistics of China, aiming to study the conditions and standard of living of urban households which include agricultural and non-agricultural residents or non-residents who live in the city for at least six months and some migrant households with local residency.<sup>3</sup> With the use of sampling techniques and daily accounting method, the survey collects data from households in different cities and counties over all 31 provinces/municipalities/autonomous in the mainland. It records household information about income and consumption expenditure, demographic characteristics, work and employment, accommodation and other family related matters.

[Figure 2 about here]

Figure 2 illustrates the map of the 16 representative provinces/municipalities which we use to study the impact of minimum wages on the Chinese labor market. We divide the 31 jurisdictions into 3 regions as in Wang and Gunderson (2011): the more prosperous and rapidly growing East, the developing Central and the less developed and slower growing West. As shown in Figure 2, the data in Eastern region are represented by darker areas which include 2 major municipalities, Beijing and Shanghai, and 4 economically important provinces such as Guangdong, Jiangsu, Shandong and Liaoning; Central region includes 6 developing provinces—Henan, Anhui, Hubei, Jiangxi and Shanxi—where most migrants come from; Western region includes the only one municipality in the West, Chongqing, and 3 less-developed provinces: Gansu, Sichuan and

---

<sup>3</sup> In 2009, the UHS has 66,060 households in sample size.

Yunnan. Collectively, our 16-province sample contains 65 percent of the total population in China, covering 60 percent of the counties over the country (National Bureau of Statistics of China 2010).

The primary objective of the minimum wage data collecting process was to both thoroughly and accurately acquire relevant information on minimum wages from each county.<sup>4</sup> In China, provinces and municipalities have considerable flexibility in setting their minimum wage standards according to local economic conditions, resulting in several levels of standards across counties/cities within a province; moreover, the adjustment date of a new minimum wage standard of a county can also differ to that of its geographically contiguous neighbors within the same province—the fact had made the estimation of minimum wage effects become more challenging. Hence, to address this concern, we collect our minimum wage data from every local government website, carefully recording the minimum wage information over 2,000 counties from 1994 to 2012. That is to say, the data contains monthly minimum wages for full-time employees, hourly minimum wages for part-time employees, the dates that local governments adjust the minimum wage standards and the extent of including social security payments and/or housing provident funds as part of the wage when calculating minimum wages.

[Table 1 about here]

We then merge the minimum wage data into the UHS, obtaining a 16-province panel dataset that contains individual/household socio-economic information and county-level minimum wages over 2002-2009 period. We present a brief summary of the minimum wage data used in our main analysis of the post new minimum wage regulations of 2004 period in Table 1. For example, columns (1), (2) and (3) correspond to the mean of monthly minimum wages, the standard deviation and the number of counties for the 3 regions as well as 16

---

<sup>4</sup> By 2012, there are 2,862 county-level administrative units in China.

provinces/municipalities in 2004, respectively.<sup>5</sup> When calculating the mean minimum wage, we use the time weighted method as suggested in Rama (2001) to address the issue of different adjustment dates among counties within a province in a year. The last row reports the mean of the minimum wage of all provinces, its standard deviation and the total number of counties for each year.

Table 1 reveals several important features. First, calculated at the county level, the mean nominal minimum wage has increased by 80 percent from 310RMB to 562RMB between 2004 and 2009 over the whole county.<sup>6</sup> Second, the East has the highest minimum wages with an average 522RMB per month in this period, followed by the West (436RMB) and the Central (424RMB). The 3 regions, surprisingly, have a similar annual growth rates of 13 percent on minimum wages.<sup>7</sup> Third, raising the minimum wage standards could happen more than once in a year. For example, Beijing increased its minimum wages twice in January and July of 2004 as well as Jiangsu raised its standards in April and July of 2008, respectively.

[Table 2 about here]

We restrict the analysis to working age population who are between 15 and 64 (Wang and Gunderson 2011); are employed in the civilian labor force; report positive annual earnings; are not self-employed and not enrolled in school. Individuals who work in the agricultural production or services, farming, forestry, fishing and ranching industries are also excluded (Neumark and Wascher 1992). Table 2 present summary statistics of the two key variables, minimum-to-average wage ratio and employment-to-population ratio, from 2004 to 2009. The second and third rows of the table show that male workers have about 10 percentage points lower

---

<sup>5</sup> Note that there was no minimum wage increase in 2009 because of the global financial crisis. The mean minimum wages have been adjusted for inflation and converted into 2005 RMB.

<sup>6</sup> In fact, the average real minimum wage has grown at similar rate as well.

<sup>7</sup> The average annual growth rate of minimum wages is 12.7 percent in Eastern regions, 13.2 percent in Central region, and 12.5 percent in Western region over the 2004-2009 period.

minimum-to-average-wage ratio and 15 percentage points higher employment-to-population ratio than females, meaning that Chinese female workers are comparatively disadvantageous in the labor market than their male counterparts. Looking at the region in Table 2, as anticipated, it shows that the more prosperous Eastern region has the lowest 0.28 minimum-to-average-wage ratio and the highest 0.61 employment-to-population ratio compared to the developing Central and less-developed Western regions.<sup>8</sup>

Mounting evidence of the minimum wage studies has consistently found that minimum wages have a larger impact on young and less-skilled workers, especially teenagers. Compared with their senior counterparts, young workers, often equip with less human capital, are more likely to earn the minimum wage. Table 2 also shows the two variables by age cohort and by educational attainment over the 2004-2009 period. Indeed, we find that Chinese young workers who aged 15 to 29 have the highest 0.39 minimum-to-average-wage ratio among all age cohorts, at least 10 percentage points larger than other cohorts. For workers with different skills, the evidence demonstrates that as the skill level increases, the minimum-to-average-wage ratio reduces quickly—dropping continuously from 0.59 for elementary school or below to 0.18 for college or above.

Table 2 also presents the minimum-to-average-wage ratio by industries. The manufacturing sector contains the largest share (21.7 percent) of the workers in our sample; the public service sector has the second (13.8 percent); the third and the fourth sectors are wholesales and retail sales trade (9.9 percent) and housekeeping (9.4 percent), respectively. Looking at the minimum-to-average-wage ratios, not surprisingly, we find that the housekeeping sector has the

---

<sup>8</sup> The minimum-to-average wage ratios in Table 2 have accounted for the issue that some provinces include social security payments and/or housing provident funds as part of the wage when calculating minimum wages. That is, minimum wages in Beijing, Shanghai and Jiangxi do not include social security payments and housing provident funds; minimum wages in Jiangsu began to include only social security payments (but not housing provident funds) on November 1st, 2005.

highest 0.51 ratio among all industries, followed by hotel and restaurant sector (0.49) and wholesales and retail sales trade (0.47).

[Table 3 about here]

We also provide a summary of the characteristics of workers who earn the minimum wage as well as less-than-the-minimum-wage in 2004-2009 in Table 3. The first row of Table 3 shows that about 5.6 percent of all workers earned less-than-the-minimum wage and 3.3 percent earned just the minimum, meaning that a combined 8.9 percent of Chinese employees are minimum wage workers over the 2004-2009 period. Among those who earned just and less-than-the-minimum-wage, 63.8 percent and 61.5 percent are females. Furthermore, the minimum-to-average-wage ratio of those less-than-the-minimum-wage workers is 2.5, meaning that these disadvantageous workers earn a wage that is only about one-quarter of the official standard.

For different age cohorts, Table 3 shows that young adults (aged 15 to 29) are more likely to be the minimum wage workers. As age cohort moves up, the percentage decreases. Similarly, we find the same decreasing pattern in the skill panel. Looking at the characteristics of workers by industry, Table 3 shows that the housekeeping sector has the largest share of minimum wage workers: about 20 percent of housekeepers earning less than or equal the minimum wage. Wholesales and retail sales as well as hotel and restaurant sectors also have 16.5 percent and 16.1 percent of workers earning below or equal the minimum wage, respectively.

## B. Research Design

Our objective is to assess the impact of minimum wages on the employment of potentially affected workers. As noted in Section II, nearly all existing studies on minimum wages in China use pooled time-series/cross-section data at provincial level and tend to find mixed results,

implying that a "consensus" employment effects remains to be explored. Given that, our study attempts to reconcile the existing findings by using a more sophisticated minimum wage data which permits the use of a panel structure analysis of minimum wage effects, exploiting the greater variation in relative minimum wages at county level, and avoiding the measurement error caused by using a uniform provincial minimum wage. Moreover, unlike previous studies that use aggregate published statistics, using household surveys microdata allows us to calculate the dependent variable—employment-to-population ratio—at county level which contains more variation and information on local conditions. Ideally, this feature should yield more reliable estimates of the employment effects of minimum wages in China.

Specifically, our panel data allow us to estimate a prespecified equation of the form proposed in Neumark (2001) and used in Campolieti, Gunderson, and Riddell (2006) and Wang and Gunderson (2011). The methodology involves in advance of the data analysis so as to preclude running alternative specifications until preferred results are obtained. Our estimation equation is:

$$E_{i,t} = \alpha_0 + \alpha_1 MW_{i,t} + \alpha_2 MW_{i,t-1} + X_{i,t} \beta + Y_t \gamma + C_i \delta + \epsilon_{i,t}, \quad (1)$$

where  $E_{i,t}$  is the employment-to-population ratio of county  $i$  in year  $t$ ;  $MW_{i,t}$  and  $MW_{i,t-1}$  are the minimum wage variables (minimum-to-average-wage ratio) of county  $i$  in year  $t$  and year  $t-1$ , respectively;  $X$  is a set of control variables to capture aggregate business cycle effects;  $Y_t$  is a set of fixed year effects, and  $C_i$  is a set of fixed county effects. The disturbance term  $\epsilon$  is assumed to be serially uncorrelated and orthogonal to the independent variables.

To address the bias from the specification error and the potential endogeneity problem, we include several control variables in estimating the equation. First, the county GDP captures aggregate business cycle effects, particularly controlling for the global financial crisis of 2008. Second, the urban recorded unemployment among registered urban residents is used to control

for aggregate economic activity (Wang and Gunderson 2011). Because the decisions of whether to increase minimum wages are determined by government officials who often have to consider local economic conditions, we collectively include these controls to address the issue.

#### IV. EMPIRICAL RESULTS AND DISCUSSIONS

##### A. The Minimum Wage Effects Across Regions

We first present the estimation results of young adults, at-risk group and the entire sample for the East, Central, West and all regions in Table 4. In each region, we estimate Eq.(1) using the fixed-effects model with both year fixed effects and county fixed effects. All regressions are appropriately weighted by the size of labor force in the counties. We report the results of two estimation equations for each of the 3 groups: the first equation uses the minimum wage variable of current year  $t$  ( $MW_{i,t}$ ) and the previous year  $t-1$  ( $MW_{i,t-1}$ ) only, while the second equation further controls for county unemployment and GDP. The signs of the regression coefficients on the independent variables are generally identical and are consistent with the theoretical expectations. Nevertheless, there are some significant differences in the magnitude of the coefficients.

[Table 4 about here]

The first and second columns of Table 4 report the estimates with cluster-robust standard errors in parentheses for young adults and at-risk group across different regions using Eq.(1), while in the third column we report the estimates of the entire sample for comparisons. The significance of our results is compelling: over the country, we find negative effects of the current and lagged minimum wages on employment—a 10 percent increase in the current and previous year minimum wage led to a statistically significant 0.88 percent and 1.28 to 1.56 percent reduction in young adults' employment, respectively; a 10 percent increase in the current and

previous year minimum wage led to a statistically significant 2.13 to 2.57 percent and 3.22 to 3.40 percent reduction in at-risk group's employment, respectively; for the entire sample, a 10 percent increase in the current and previous year minimum wage led to a statistically significant 0.47 to 0.55 percent and 0.25 to 0.31 percent reduction in employment.

In the more developed and prosperous East which has a large population residing in the big cities such as Beijing, Shanghai and Guangzhou, the minimum wage has been an important policy tool during China's transition to a market economy. Consequently, the magnitude and frequency of minimum wage increase are relatively high in these regions in which the impact of minimum wages on employment could be evident. Indeed, consistent with the evidence in Table 4, our estimates indicate that the current minimum wage in the Eastern region has a statistically significant adverse impact on employment with elasticities of -0.156 to -0.234, and a lagged adverse effect with an elasticity of -0.1 for young adults. Furthermore, we find a large and negative lagged minimum wage effects on the employment of at-risk group—a 10 percent increase in the minimum wage led to a statistically significant 3.22 to 3.68 percent reduction in employment. The current minimum wage effects are negative, however, they are not statistically significant.

In the economic developing Central, we also find all lagged minimum wages have a strong negative employment effect on young adults, at-risk group and the entire working population. The minimum wage has an adverse lagged employment effect with elasticities of -0.209 to -0.216 for young adults and -0.289 to -0.336 for at-risk group. For the entire working population in the East, the elasticity is in the range of -0.041 to -0.057. The estimates of the current minimum wage variable are negative, however, they are not statistically significant.



Finally, in the less-developed West, we do not find the minimum wage has a impact on employment. Nevertheless, without controlling for local economic conditions, our empirical results show positive coefficients (not statistically significant) of current and lagged minimum wages. When economic conditions are controlled, we find positive estimates in the current minimum wage for young adults and in the lagged minimum wage for at-risk group. The phenomenon would be consistent with a monopsony story that the Western region is historically and geographically segmented from the more prosperous eastern region of China.

#### B. Gender and Age Cohort

An enormous minimum wage studies have reported that the young workers are most likely to be directly affected by minimum wage increases, and the disemployment effect seems especially strong on teenagers. Especially, female workers are particularly disadvantageous in the labor market. In the case of China, we examine the effects of minimum wages on employment by separating the sample into four subgroups, i.e., age 15 to 29, age 30 to 39, age 40 to 49 and age 50 to 64.<sup>9</sup> In each age cohort, we separately estimate Eq.(1) using the fixed-effects model on males and females and report the results in Table 5. Since panel data regression with both year fixed effects and county fixed effects has the advantage of eliminating omitted variable bias arising both from unobserved variables that are constant over time and from unobserved variables that are constant across counties, we focus on the results of this specification. The signs of the regression coefficients of the independent variables are generally consistent with the theoretical expectations.

[Table 5 about here]

---

<sup>9</sup> Since the number of age 15 to 19 workers is relatively small in our sample, we use the group of age 15 to 29 to represent young workers.

We present the estimates for all regions in panel A. The results show that the current minimum wage has an adverse effect on the employment of female young workers (age 15-29): a 10 percent increase in the minimum wage results in a statistically significant 1.48 percent reduction in employment and a minor lagged effect with an elasticity of -0.52. Furthermore, we find the negative effects on females attenuate as the age cohort moves up, showing that the elasticity of the current effect is -0.72 for female aged 30-39 and that of the lagged effect is -0.037 for females aged 40-49. In contrast, we do not find a significant effect of minimum wages on female aged 50-54 and on male employment for each age cohort.

In other regions, the minimum wage seems to have an adverse employment effect on young female in Eastern and Central regions—a 10 percent increase in the minimum wage led to a statistically significant 1.59 percent and 1.70 percent reduction in employment for the East and Central, respectively. We also find minor disemployment effects of minimum wages on male in the Central with elasticities of -0.052 for the current and -.066 for the lagged minimum wage variables.

### C. Skill Levels

In the literature, the preponderance of evidence supports the view that minimum wages reduce the employment of low-wage workers. Moreover, when researchers focus on the least-skilled groups that are most likely to be directly affected by minimum wage increase, the evidence for disemployment effects seems especially strong (Neumark and Wascher 2008). We present the estimation results by three skill groups represented by educational attainment in Table 6. In each group, we report the estimates using the fixed-effects model with both year fixed effects and county fixed effects.

[Table 6 about here]

Our estimates reveal disemployment effects of minimum wages on low-skilled workers. For example, looking at panel A of Table 6, the results show that the minimum wage has an adverse effect on the employment of workers who are high school graduates or below: the elasticities of -0.07 and 0.08 are statistically significant at 5 percent level and is robust under different specifications. Furthermore, we also find lagged negative effects of minimum wages on the employment of vocational school degree workers—a 10 percent increase in the previous year minimum wage results in a statistically significant 0.4 percent reduction in employment.

In the East, we find that the current minimum wage has a negative employment effect on low-skilled workers (high school graduates or below) with an elasticity of -0.07 but no effect on other workers with higher degrees. Evidently from Panel C of Table 6, we find that the minimum wage has an impact on low-skilled workers in the Central with elasticities are in the range of -0.52 to -0.71. In addition, we also find a lagged disemployment effect on workers with vocational school degrees in the Central with an elasticity of -0.08. Finally, we examine the effect of minimum wages on workers with a college degree or above (including junior college) and do not find a significant effect in every region.

#### D. Minimum Wage Effects on Migrant Workers

The new minimum wage regulations of 2004 were design in large part to protect rural migrant workers who tend to work in nonstate enterprises in which labor standards and wages are low (Cooke 2005; Zhang and Deng 2005; Wang and Gunderson 2011). Minimum Wages are expected to have a stronger effect on rural migrant workers because they tend to work in low-wage sectors and the higher wages will induce some enterprises to use higher skilled workers or more capital to substitute for the now higher priced rural workers (Wang and Gunderson 2011).

Using the micro-level UHS data, we are able to examine how the minimum wage affect the employment of rural migrant workers at county level. Due to the fact that very few observations of rural migrants work in state-owned enterprises, we focus on nonstate enterprises and report the results of all enterprises as well. Table 7 reports the results for Eastern, Central and Western regions. Consistent to the findings in Wang and Gunderson (2011), we find that the minimum wage has negative employment effects on rural migrant workers in the less-developed and slower growing Western regions: for all enterprises, a 10 percent increase in the lagged minimum wage results in a statistically significant 2.25 to 2.82 percent reduction in employment; in particular, for migrant workers in nonstate enterprises we find a larger disemployment effect of current minimum wages with elasticities of -0.401 and -0.411. In contrast, the results show positive coefficients of the minimum wage variables in the East which is consistent with monopsonistic behavior found in Wang and Gunderson (2011) .

#### E. Endogeneity Issue

In China, the decisions of whether to increase minimum wages are determined by local government officials who often have to consider various factors such as economic conditions which could result in potential endogeneity problem, making our results unreliable. To possibly address this issue, we separate our sample into 3 different time periods—2002-2004, 2004-2007 and 2008-2009— by viewing the promulgation of new minimum wage regulations in 2004 as a quasi-experiment. Specifically, we estimate Eq.(1) for the 3 time periods and focus on young adults and at-risk group.<sup>10</sup>

Table 8 reports the estimates for all regions in Panel A, the Eastern regions in Panel B, and Central and West regions in Panel C. The evidence supporting our main results is significant:

---

<sup>10</sup> Because there are not enough observations in the West in the 2002-2004 period, we combine Central and West and report the results in Panel C of Table 8.

over the country, we do not find minimum wages have effect on employment in the 2002-2004 period; on the contrary, we find the current and lagged minimum wages do have negative effects on at-risk group in the 2004-2007 period and a lagged disemployment effect on young adults in the 2008-2009 period. In separate regions, we find a similar phenomenon in the East where there is no effect in the 2002-2004 period but the minimum wage has negative employment effects both in the 2004-2007 and the 2008-2009 periods. In the Central and West regions, we find lagged negative effects on young adults in both the post-2004 periods but no effect in the 2002-2004 period.<sup>11</sup>

In short, our results in Table 8 seem to support the pattern in Figure 1 that year 2004 is the watershed of the minimum wage policy in China. Empirically, the new minimum wage standards of 2004 can be viewed as a natural experiment which could possibly address the endogenous issue.

## V. CONCLUSIONS

We use a large panel data at the county level which contains relevant information on minimum wages combined with a longitudinal household survey of 16 representative provinces to estimate the employment effect of minimum wage changes in China over 2004 to 2009 period. After the new minimum wage regulations were promulgated in 2004, the magnitude and frequency of minimum wage changes have been substantial and high both over time and across different jurisdictions. This paper presents evidence that, relative to previous studies which use provincial level data and find mixed results, minimum wage changes have significant negative effects on the employment of more prosperous Eastern region, and result in disemployment on females, young adults, and less-skilled workers, particularly the at-risk group.

---

<sup>11</sup> For at-risk group, we do not find significant effects in the 2004-2007 and 2008-2009 periods, however, there is a statistically significant positive effect in the current minimum wage variable. We are aware that there is only 31 observations in the Central and West for this group, hence, one should interpret this coefficient in caution.

We began with estimating the employment effects of minimum wages by 3 geographically regions, and sought to explain the impact for the 2004 to 2009 period. The estimates showed that in the more developed East parts of China, we find statistically significant negative employment effects of the current and lagged minimum wages with elasticities in the range of -0.156 to -0.234 and -0.10, respectively. Furthermore, we found that minimum wage changes in the Easter region resulted in the largest disemployment effect on at-risk group—elasticities in the range of -3.22 to -3.68—over the same period. In the Central, we found the minimum wage has lagged effects—a 10 percent increase in the minimum wage led to a statistically significant 2.09 to 2.16 percent and 2.89 to 3.36 percent reduction in employment for young adults and at-risk group, respectively. In contrast, we did not find significant effects in the less prosperous and slower growing Western region.

We then assessed the effect of minimum wages by gender and by age cohorts. Consistent with most studies in the literature, we found the minimum wage has negative effects on female and young workers—the most disadvantageous and vulnerable groups in the labor market. However, we did not find significant effects on the employment of their male and senior counterparts.

Our study seems to reconcile the existing mixed results in Ni, Wang, and Yao (2011) and Wang and Gunderson (2011). By examining the effects on several subgroups, we find that, similar to Ni, Wang, and Yao (2011), the minimum wage has a significantly negative effect on all employees in the East and a lagged positive effect in Western region in 2004-2009; on the contrary, using rural migrants as the target group, we find that the minimum wage has an adverse and significant effect in the West and a positive effect (though statistically insignificant) in Eastern region over the same period as found in Wang and Gunderson (2011).

Finally, we investigated whether the minimum wage has effects on the employment of less-skilled workers. Our results support the preponderance of evidence that minimum wages reduce the employment of low-skilled workers, showing that Chinese workers who are high school graduates or below or with vocational school degrees were directly and adversely affected by minimum wage increases.

## REFERENCES

- Campolieti, Michele, Morley Gunderson, and Chris Riddell. 2006. "Minimum Wage Impacts from a Prespecified Research Design: Canada 1981–1997." *Industrial Relations: A Journal of Economy and Society* 45 (2):195-216.
- Chan, Anita. 2001. *China's Workers under Assault: The Exploitation of Labor in a Globalizing Economy*: ME Sharpe.
- Cheung, Steven N. S. 2004. Another Eye on Minimum Wages. In *Southern Weekly*. June 17 (in Chinese).
- \_\_\_\_\_. 2010. The Lethality of Minimum Wages. In *Economic Information Daily*. February 24 (in Chinese).
- Cooke, Fang Lee. 2005. *Hrm, Work and Employment in China*: Routledge.
- Ding, Shouhai. 2009. "An Analysis of Minimum Wage Effects on the Employment of Rural-Urban Migrant-Evidence from the Survey of 827 Rural-Ruban Migrants in Beijing." *China Rural Survey* 4:26-36 (in Chinese).
- Du, Yang, and Meiyang Wang. 2008. "The Implementation of Minimum Wage System and Its Effects in China." *Journal of Graduate School of Chinese Academy of Social Sciences* 6:56-62 (in Chinese).
- Gong, Qiang. 2009. "The Impact of Mimimum Wages on Welfare of Firm and Labor in China." *Journal of Nanjing University* 2:61-68 (in Chinese).
- Han, Zhaozhou, and Zhangjin Wei. 2011. "Minimum Wage Standards: Questions and Policies." *Guangdong Social Sciences* 1:192-200 (in Chinese).
- Jia, Peng, and Shiwei Zhang. 2013. "Spillover Effects of Minimum Wages Increase." *Statistical Research* 30 (4):37-41 (in Chinese).
- National Bureau of Statistics of China. 2010. *The 6th China Population Census*.

- Neumark, David. 2001. "The Employment Effects of Minimum Ages: Evidence from a Pre-Specified Research Design." *Industrial Relations: A Journal of Economy and Society* 40:121-44.
- Neumark, David, and William Wascher. 1992. "Employment Effects of Minimum and Subminimum Wages: Panel Data on State Minimum Wage Laws." *Industrial and Labor Relations Review* 46 (1):55-81.
- Neumark, David, and William L. Wascher. 2008. *Minimum Wages*. Vol. 1, Mit Press Books: The MIT Press.
- Ni, Jinlan, Guangxin Wang, and Xianguo Yao. 2011. "Impact of Minimum Wages on Employment: Evidence from China." *The Chinese Economy* 44 (1):18-38.
- Ping, Xinqiao. 2005. "On the Industrial Relations of Private Companies." *China Reform* 4:61-62 (in Chinese).
- Rama, Martin. 2001. "The Consequences of Doubling the Minimum Wage: The Case of Indonesia." *Industrial and Labor Relations Review* 54 (4):864-81.
- Sun, Suqing. 2006. "The Economic Analysis for the Chinese Employment Influence to the Adjusting the Lowest Wage Policy." *Journal of Hubei College of Finance and Economics* 18 (5):13-15 (in Chinese).
- Wang, Jing, and Morley Gunderson. 2011. "Minimum Wage Impacts in China: Estimates from a Prespecified Research Design, 2000-2007." *Contemporary Economic Policy* 29 (3):392-406.
- Xue, Zhaofeng. 2004. *The Undesirable Minimum Wage Law*. In *21st Century Business Herald*. November 18 (in Chinese).
- Ye, Min. 2005. "Discussions on the Effects of Minimum Wages on Rural-Urban Migrant Workers and the Youth." *Theory and Modernization* 7:86-87.
- Zhang, Juan, and Juqiu Deng. 2005. "On Minimum Wage System of Peasant Laborers." *Journal of Beijing Agricultural Vocation College* 19 (5):46-49 (in Chinese).
- Zhang, Zhiyong. 2007. "Will Minimum Wage Decrease Immigrant Peasant Workers' Employment?" *Finance and Economics* 10:103-10 (in Chinese).



**Table 1 Minimum Wages Across Various Jurisdictions in China, 2004–2009**

Province	2004			2005			2006			2007			2008			2009		
	MW	S.D.	Obs.	MW	S.D.	Obs.	MW	S.D.	Obs.	MW	S.D.	Obs.	MW	S.D.	Obs.	MW	S.D.	Obs.
East																		
Beijing	509.5	.0	2	562.5	.0	2	611.8	.0	2	665.4	.0	2	735.4	.0	2	820.1	.0	2
Shanghai	590.3	.0	2	662.5	.0	2	712.1	.0	2	757.7	.0	2	894.0	.0	2	984.2	.0	2
Liaoning	282.3	46.0	96	361.9	36.6	96	405.5	41.2	96	465.8	48.7	96	550.1	59.9	97	587.8	63.2	97
Shandong	348.4	35.2	129	440.9	50.0	129	454.6	53.5	129	476.2	66.3	129	571.9	75.6	129	609.9	80.6	129
Jiangsu	416.2	59.9	66	457.6	66.8	66	517.9	70.4	66	591.0	78.0	75	647.8	88.1	75	694.4	94.7	75
Guangdong	361.2	59.9	104	442.1	80.6	104	475.0	84.9	104	516.6	88.5	104	574.3	88.2	104	636.1	98.2	104
All East	349.1	68.5	339	426.7	72.1	399	460.6	76.0	399	507.4	86.5	408	583.6	87.6	409	629.7	95.7	409
Central																		
Heilongjiang	282.0	28.1	30	287.8	28.7	30	384.0	45.7	30	418.0	53.6	30	456.0	58.6	30	486.3	62.5	30
Anhui	304.6	11.7	86	330.7	17.1	86	350.1	19.1	86	400.7	27.1	86	420.4	29.2	86	448.3	31.2	86
Jiangxi	246.7	6.6	99	317.7	8.9	100	328.9	9.4	100	427.5	15.2	100	460.3	21.8	100	490.9	23.3	100
Shanxi	348.2	21.8	119	445.4	22.3	119	454.2	22.4	119	476.3	21.6	119	536.6	22.8	119	642.5	28.6	119
Hubei	271.9	34.9	89	320.6	36.8	89	330.2	37.2	89	402.4	39.1	89	453.4	45.6	89	541.5	58.5	89
Henan	251.5	15.5	127	278.5	17.0	127	345.0	27.9	127	371.1	25.7	127	477.2	42.5	127	509.0	45.3	127
All Central	284.8	43.6	550	337.1	63.8	551	366.2	54.7	551	416.3	46.3	551	473.1	51.7	551	529.1	77.0	551
West																		
Gansu	298.2	8.5	87	304.4	8.7	87	322.1	16.3	87	344.6	35.1	87	471.6	36.3	87	549.4	39.2	87
Chongqing	334.7	21.7	42	365.7	24.6	42	409.0	30.1	42	477.8	39.8	42	554.8	44.5	42	591.7	47.4	42
Sichuan	295.4	32.1	50	352.2	41.9	50	392.2	43.8	50	425.0	42.3	181	477.9	53.0	181	509.7	56.5	181
Yunnan	297.5	18.0	138	365.2	23.4	138	403.6	23.4	138	427.0	22.8	138	527.2	31.5	138	562.3	33.6	138
All West	302.3	23.3	317	346.5	36.1	317	380.1	45.0	317	414.9	51.8	448	499.1	52.3	448	541.3	54.1	448
All Provinces	309.5	56.7	1266	367.7	73.1	1267	399.4	73.3	1267	442.3	74.8	1407	513.5	79.2	1408	562.2	88.3	1408

*Note:* MW represents the mean of time-weighted monthly minimum wages calculated by using all counties in a jurisdiction and it has been adjusted for inflation and converted into 2005 RMB.

**Table 2 Summary Statistics**

Variables		Minimum/Average Wage		Employment/Population			
		Mean	S.D.	Mean	S.D.		
All		100.0	.291	.094	.595	.072	
Gender	Male	55.3	.256	.089	.673	.074	
	Female	44.7	.354	.115	.520	.087	
Region	East	54.1	.276	.099	.607	.068	
	Central	32.9	.298	.086	.586	.074	
	West	13.0	.335	.074	.572	.071	
Age Cohort	Age 15–29	13.1	.392	.167	.359	.129	
	Age 30–39	30.7	.295	.107	.810	.096	
	Age 40–49	35.8	.283	.096	.802	.094	
	Age 50–64	20.3	.278	.128	.415	.110	
Educational Attainment	Elementary School or Below	2.1	.593	.505	.226	.139	
	Junior High School	20.7	.433	.135	.447	.101	
	High School	25.2	.355	.107	.566	.098	
	Vocational School	12.0	.314	.112	.673	.131	
	Junior College	24.8	.246	.086	.801	.092	
	College or Above	15.2	.183	.085	.797	.120	
Industry	Mining	2.3	.291	.201	-	-	
	Manufacturing	21.6	.346	.134	-	-	
	Power Production and Supply	3.4	.248	.142	-	-	
	Construction	3.2	.352	.211	-	-	
	Transportation and Postal Service	7.6	.288	.132	-	-	
	Information Technology	2.4	.292	.314	-	-	
	Wholesales and Retail sales	9.9	.471	.197	-	-	
	Hotel and Restaurant	2.7	.498	.333	-	-	
	Banking and Finance	2.9	.234	.157	-	-	
	Real Estate	1.9	.355	.353	-	-	
	Leasing and Commercial Service	1.6	.371	.313	-	-	
	Scientific Research	2.1	.204	.175	-	-	
	Environment and Public Facility	1.3	.311	.212	-	-	
	Housekeeping	9.6	.509	.213	-	-	
	Education	7.2	.237	.101	-	-	
	Health Care	4.8	.265	.170	-	-	
	Sports and Entertainment	1.8	.280	.226	-	-	
	Public Service	13.9	.245	.094	-	-	
	Total observations		287,668				

*Note:* Average wage is calculated as the mean wage in each category. Since age cohort 16-19 and 20-24 only account for .17 percent and 3.6 percent of total observations, here we choose the first age cohort to be age 16-29.

**Table 3 Characteristics of Workers Earning the Minimum Wage, 2004-2009**

Variables	Less than Minimum	Minimum	More than Minimum
Percent of Total (%)	5.62	3.28	91.09
Percent of Female (%)	61.52	63.84	42.99
Minimum/Average Wage	2.52 (4.66)	1.00 (.06)	.35 (.20)
Region (%)			
East	5.33	3.27	91.40
Central	5.46	2.88	91.66
West	7.26	4.36	88.38
Age			
Age 15–29	9.53	4.30	86.17
Age 30–39	4.73	2.84	92.43
Age 40–49	4.90	3.26	91.83
Age 50–64	5.73	3.33	90.94
Educational Attainment			
Elementary School or Below	15.75	9.41	74.84
Junior High School	9.43	6.00	84.57
High School	6.60	3.99	89.40
Vocational School	4.89	2.85	92.26
Junior College	3.08	1.50	95.43
College or Above	2.17	0.82	97.01
Industry			
Mining	3.10	1.88	95.02
Manufacturing	5.50	3.30	91.20
Power Production and Supply	2.47	1.37	96.16
Construction	5.78	3.04	91.17
Transportation and Postal Service	4.00	2.10	93.90
Information Technology	5.42	2.27	92.31
Wholesales and Retailsales	10.46	6.30	83.24
Hotel and Restaurant	9.98	6.52	83.50
Banking and Finance	2.74	1.21	96.04
Real Estate	5.46	3.05	91.49
Leasing and Commercial Service	6.37	3.16	90.46
Scientific Research	2.20	0.84	96.96
Environment and Public Facility	3.89	2.23	93.87
Housekeeping	12.63	7.58	79.79
Education	2.74	1.39	95.87
Health Care	3.57	1.74	94.69
Sports and Entertainment	4.10	1.77	94.13
Public Service	2.41	1.77	95.82

*Note:* standard deviations are in parentheses.

**Table 4 Estimates of Minimum Wage Effects on the Employment-to-Population Ratio**

Dependent Variable: Employment/Population	Young Adults		At-Risk Group		Entire Sample	
Independent Variable	(1)	(2)	(1)	(2)	(1)	(2)
<b>A. All Regions</b>						
MW	-.088** (.042)	-.055 (.043)	-.213* (.128)	-.257** (.310)	-.055*** (.018)	-.047*** (.018)
MW, lagged 1 Year	-.156*** (.040)	-.128*** (.042)	-.340*** (.268)	-.322*** (.265)	-.031*** (.012)	-.025** (.012)
UNEMPLOYMENT		-.031 (.025)		-.004 (.038)		-.021*** (.008)
COUNTY GDP		.111*** (.021)		.249** (.121)		.027*** (.007)
$R^2$	.144	.196	.024	.035	.079	.103
Sample size	1,601	1,550	1,294	1,252	1,681	1,630
<b>B. East</b>						
MW	-.234*** (.047)	-.156*** (.053)	-.201 (.219)	-.259 (.192)	-.068*** (.025)	-.071*** (.028)
MW, lagged 1 Year	-.100** (.048)	-.057 (.051)	-.322** (.128)	-.368*** (.120)	-.018 (.020)	-.008 (.020)
UNEMPLOYMENT		.025 (.032)		.022 (.058)		-.028** (.016)
COUNTY GDP		.051* (.030)		.317* (.181)		.018 (.010)
$R^2$	.213	.228	.041	.059	.084	.104
Sample size	733	715	617	606	762	744
<b>C. Central</b>						
MW	-.032 (.068)	-.024 (.068)	-.297 (.181)	-.298 (.185)	-.039 (.025)	-.027 (.023)
MW, lagged 1 Year	-.216*** (.061)	-.209*** (.062)	-.336* (.174)	-.289* (.173)	-.041*** (.015)	-.057*** (.016)
UNEMPLOYMENT		-.064 (.041)		-.043 (.053)		-.023* (.012)
COUNTY GDP		.096** (.042)		.288* (.166)		.031** (.013)
$R^2$	.129	.153	.031	.043	.094	.127
Sample size	663	654	497	489	708	699
<b>D. West</b>						
MW	.088 (.114)	.005 (.120)	.018 (.208)	-.047 (.218)	-.096 (.063)	-.107 (.113)
MW, lagged 1 Year	.124 (.107)	-.004 (.110)	.000 (.258)	.102 (.235)	.055 (.075)	.124 (.112)
UNEMPLOYMENT		.066 (.050)		.039 (.028)		-.032* (.015)
COUNTY GDP		.035 (.057)		.042** (.021)		.091 (.107)
$R^2$	.153	.118	.014	.026	.015	.043
Sample size	205	181	180	157	211	187

Note: Cluster-robust standard errors are in parentheses.

**Table 5 Estimates of Minimum Wage Effects on the Employment, by Age Cohort**

Dependent Variable: Employment/Population	Age 15-29		Age 30-39		Age 40-49		Age 50-64	
Independent Variables	Male	Female	Male	Female	Male	Female	Male	Female
<b>A. All Regions</b>								
MW	-.027 (.046)	-.148*** (.047)	-.018 (.028)	-.072*** (.025)	.018 (.016)	-.031 (.025)	.021 (.053)	.049 (.054)
MW, lagged 1 Year	-.028 (.029)	-.052* (.003)	-.025 (.017)	-.021 (.021)	-.017 (.013)	-.037** (.016)	.004 (.031)	-.008 (.032)
UNEMPLOYMENT	-.006 (.029)	-.031 (.027)	-.010 (.016)	-.025** (.011)	-.009 (.010)	-.025* (.013)	-.028 (.034)	-.022 (.060)
COUNTY GDP	.118*** (.023)	.093*** (.022)	.006 (.055)	.044*** (.010)	.010 (.057)	.057*** (.012)	.172 (.109)	.211 (.208)
$R^2$	.159	.148	.027	.104	.015	.094	.049	.051
Sample size	1,469	1,473	1,581	1,582	1,586	1,582	1,569	1,403
<b>B. East</b>								
MW	-.097 (.114)	-.159** (.080)	-.024 (.022)	-.057 (.041)	-.002 (.017)	-.047 (.033)	.009 (.042)	-.035 (.062)
MW, lagged 1 Year	-.012 (.049)	-.036 (.047)	-.009 (.011)	.009 (.032)	-.019 (.013)	-.014 (.024)	-.006 (.031)	.007 (.043)
UNEMPLOYMENT	-.062 (.091)	.007 (.037)	-.017* (.009)	-.034 (.032)	.011 (.010)	-.033* (.020)	.034 (.022)	-.091 (.061)
COUNTY GDP	.112 (.299)	.055 (.034)	.003 (.009)	.117 (.211)	.004 (.010)	.040** (.017)	.008 (.019)	.116** (.050)
$R^2$	.141	.164	.060	.050	.017	.096	.040	.066
Sample size	696	696	721	725	729	723	721	661
<b>C. Central</b>								
MW	.020 (.061)	-.170** (.068)	-.052*** (.020)	-.090*** (.041)	.012 (.023)	.065 (.060)	.037 (.080)	.067 (.061)
MW, lagged 1 Year	-.011 (.047)	-.058 (.043)	-.066*** (.020)	-.067* (.035)	-.022 (.022)	-.013 (.069)	.027 (.049)	-.065* (.035)
UNEMPLOYMENT	-.082** (.040)	-.017 (.046)	-.027** (.012)	-.028* (.017)	-.010 (.013)	-.014 (.033)	-.059 (.048)	-.006 (.041)
COUNTY GDP	.140*** (.040)	.033 (.046)	.029** (.013)	.061*** (.020)	.036 (.480)	.026 (.099)	.153 (.144)	.029 (.050)
$R^2$	.134	.100	.091	.143	.017	.047	.046	.022
Sample size	603	609	674	671	672	676	668	576
<b>D. West</b>								
MW	-.004 (.205)	-.106 (.098)	.239* (.121)	-.003 (.087)	.037 (.041)	-.092 (.067)	-.224 (.169)	-.324*** (.123)
MW, lagged 1 Year	.028 (.158)	-.140 (.087)	.174** (.070)	.023 (.091)	-.003 (.051)	.074 (.054)	-.047 (.093)	.075 (.010)
UNEMPLOYMENT	-.308*** (.112)	-.039 (.041)	-.055** (.026)	-.049*** (.019)	-.041** (.018)	-.009 (.024)	-.055 (.041)	-.046 (.065)
COUNTY GDP	.009 (.434)	.087* (.046)	.154 (.119)	.012 (.023)	.027 (.019)	.042 (.026)	.013 (.039)	.342 (.450)
$R^2$	.132	.116	.141	.035	.017	.116	.074	.246
Sample size	170	168	186	186	185	183	180	166

Note: Cluster-robust standard errors are in parentheses.

**Table 6 Estimates of Minimum Wage Effects on Employment, by Educational Attainment**

Dependent Variable: Employment/Population	High School or Below		Vocational School		Junior College		College or Above	
Independent Variables	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
<b>A. All Regions</b>								
MW	-.080** (.040)	-.070** (.047)	-.037 (.025)	-.039 (.025)	-.018 (.020)	-.024 (.020)	-.006 (.013)	-.017 (.013)
MW, lagged 1 Year	-.019 (.020)	-.013 (.021)	-.040** (.020)	-.042** (.020)	-.002 (.021)	-.012 (.022)	-.005 (.015)	-.019 (.015)
UNEMPLOYMENT		-.012 (.010)		-.033** (.013)		-.025*** (.007)		-.033*** (.012)
COUNTY GDP		.035*** (.009)		.006 (.011)		.005 (.007)		.004 (.009)
$R^2$	.046	.077	.036	.079	.044	.099	.003	.041
Sample size	1,655	1,604	1,593	1,542	1,637	1,586	1,578	1,528
<b>B. East</b>								
MW	-.070* (.038)	-.074* (.041)	-.049 (.046)	-.033 (.046)	-.048 (.037)	-.062 (.038)	-.031 (.020)	-.024 (.020)
MW, lagged 1 Year	-.025 (.023)	-.021 (.024)	-.003 (.028)	-.002 (.029)	.028 (.027)	.017 (.028)	-.039 (.027)	-.035 (.029)
UNEMPLOYMENT		-.001 (.020)		-.033 (.030)		-.047*** (.011)		-.140* (.083)
COUNTY GDP		.008 (.017)		.154 (.128)		.012 (.011)		.155* (.084)
$R^2$	.056	.062	.028	.033	.053	.122	.011	.061
Sample size	752	734	726	708	744	726	733	715
<b>C. Central</b>								
MW	-.071** (.034)	-.065* (.034)	-.048 (.037)	-.048 (.037)	.012 (.023)	.010 (.023)	.006 (.022)	.001 (.022)
MW, lagged 1 Year	-.052** (.025)	-.053** (.026)	-.083*** (.032)	-.084*** (.032)	-.030 (.033)	-.033 (.034)	.011 (.022)	.008 (.022)
UNEMPLOYMENT		-.025** (.012)		-.016 (.021)		-.011 (.011)		-.005 (.016)
COUNTY GDP		.038** (.016)		.022 (.023)		.023 (.014)		.034** (.017)
$R^2$	.083	.095	.073	.098	.045	.089	.012	.042
Sample size	693	684	659	650	683	674	639	631
<b>D. West</b>								
MW	-.184 (.163)	-.177 (.181)	-.019 (.073)	-.025 (.083)	-.068 (.062)	-.040 (.074)	.033 (.084)	.018 (.092)
MW, lagged 1 Year	.154 (.120)	.182 (.129)	-.046 (.090)	-.011 (.085)	.020 (.078)	.011 (.084)	-.020 (.070)	-.016 (.074)
UNEMPLOYMENT		-.049** (.025)		-.027 (.032)		-.002 (.019)		-.018 (.020)
COUNTY GDP		.015 (.022)		.047 (.033)		.027 (.020)		.020 (.018)
$R^2$	.013	.075	.028	.049	.017	.079	.019	.101
Sample size	210	186	208	184	210	186	206	182

Note: Cluster-robust standard errors are in parentheses.

**Table 7 Estimates of Minimum Wage Effects on the Employment of Migrant Workers**

Dependent Variable: Employment/Population		East		Central		West	
Independent Variables	(1)	(2)	(1)	(2)	(1)	(2)	
<b>A. All Enterprises</b>							
MW	.022 (.058)	.048 (.063)	-.005 (.051)	-.021 (.050)	-.146 (.097)	-.077 (.063)	
MW, lagged 1 Year	.027 (.047)	.045 (.053)	.031 (.067)	.023 (.070)	-.282*** (.058)	-.225*** (.071)	
UNEMPLOYMENT		-.077 (.063)		-.093 (.101)		-.471 (.547)	
COUNTY GDP		.008 (.056)		.163* (.095)		2.806* (1.425)	
$R^2$	.014	.042	.091	.142	.399	.486	
Sample size	249	240	104	102	83	75	
<b>B. Nonstate Enterprises Only</b>							
MW	.077 (.113)	.081 (.084)	-.017 (.057)	-.043 (.060)	-.411*** (.098)	-.401*** (.130)	
MW, lagged 1 Year	.013 (.075)	.020 (.061)	.057 (.079)	.033 (.080)	-.120 (.124)	-.069 (.128)	
UNEMPLOYMENT		-.090 (.068)		-.061 (.101)		-.299 (.606)	
COUNTY GDP		.005 (.062)		.116 (.097)		1.178 (1.572)	
$R^2$	.147	.214	.202	.246	.489	.573	
Sample size	224	215	84	82	69	64	

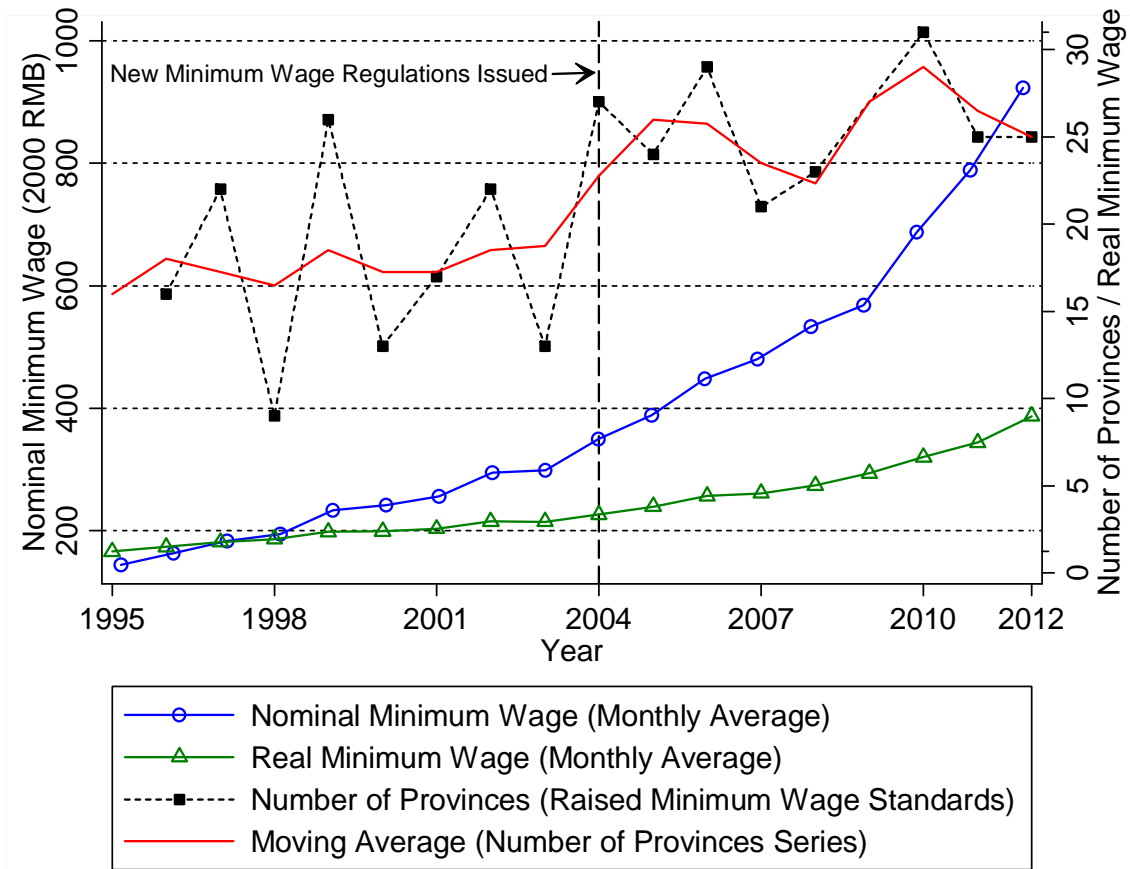
*Note:* Cluster-robust standard errors are in parentheses. The effects of migrant workers of the state-owned enterprises cannot be estimated due to insufficient number of observations.

**Table 8 Estimates of Minimum Wage Effects on the Employment, by Period**

Dependent Variable: Employment/Population	2002-2004		2004-2007		2008-2009	
Independent Variables	Young Adults	At-Risk Group	Young Adults	At-Risk Group	Young Adults	At-Risk Group
<b>A. All Regions</b>						
MW	-.141 (.162)	.391 (.301)	-.057 (.077)	-.362** (.159)	-.048 (.047)	-.047 (.234)
MW, lagged 1 Year	-.014 (.090)	-.084 (.377)	-.091 (.057)	-.260** (.108)	-.098** (.040)	-.277 (.199)
UNEMPLOYMENT	-.060 (.062)	-.012 (.030)	-.039 (.036)	-.022 (.040)	-.022 (.023)	-.003 (.049)
COUNTY GDP	-.001 (.066)	.004 (.027)	.118 (.030)	.093 (.151)	.109 (.022)	.173 (.173)
$R^2$	.102	.073	.171	.039	.154	.016
Sample size	79	66	613	528	937	724
<b>B. East</b>						
MW	.082 (.168)	-.017 (.475)	-.182 (.111)	-.293 (.230)	-.126** (.054)	.236 (.169)
MW, lagged 1 Year	.017 (.088)	-.012 (.540)	-.026 (.077)	-.218* (.117)	-.060 (.055)	-.382* (.205)
UNEMPLOYMENT	-.106 (.091)	-.040 (.080)	-.043 (.040)	-.001 (.056)	-.030 (.039)	-.014 (.019)
COUNTY GDP	.041 (.110)	.050 (.073)	.040 (.041)	.298 (.365)	.053 (.035)	.023 (.017)
$R^2$	.080	.043	.192	.030	.198	.033
Sample size	41	35	297	258	418	348
<b>C. Central and West</b>						
MW	-.291 (.384)	1.213** (.485)	-.011 (.102)	-.176 (.141)	-.018 (.068)	-.207 (.276)
MW, lagged 1 Year	-.262 (.319)	-.580 (.768)	-.152* (.079)	-.129 (.153)	-.131** (.054)	-.248 (.274)
UNEMPLOYMENT	-.069 (.100)	-.013 (.036)	-.060 (.053)	-.007 (.020)	-.029 (.029)	-.039 (.049)
COUNTY GDP	.019 (.102)	-.015 (.044)	.083 (.057)	.009 (.021)	.096*** (.034)	.348 (.240)
$R^2$	.169	.242	.103	.018	.086	.023
Sample size	38	31	316	270	519	376

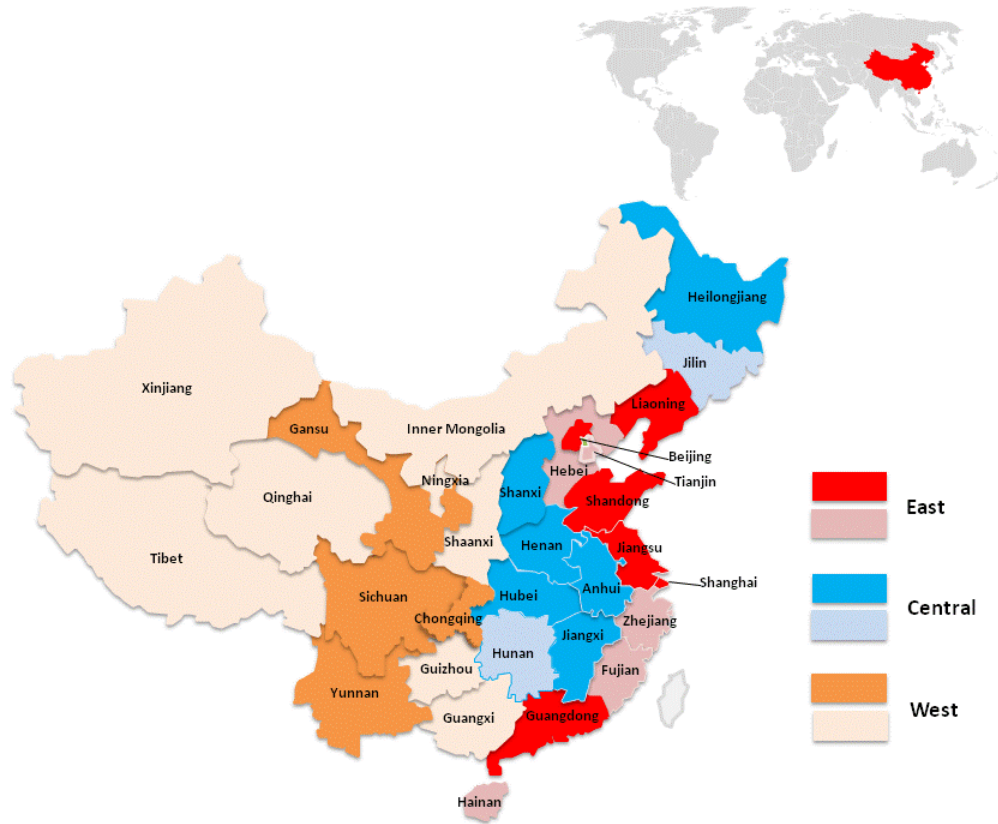
Note: Cluster-robust standard errors are in parentheses.





**Figure 1 Minimum Wages in China, 1995–2012**

Nominal and real minimum wages are adjusted for inflation and expressed in 2000 RMB.



**Figure 2 Panel Data with Minimum Wages in China**

The panel data used in the analysis includes 16 provinces/municipalities (darker areas in the map), spreading out among 3 regions in mainland China. The East includes Liaoning, Beijing, Shandong, Jiangsu and Guangdong; The Central includes Heilongjiang, Shanxi, Henan, Anhui, Hubei and Jiangxi; The West includes Gansu, Chongqing, Sichuan and Yunnan.