Minimum Wages and Income Inequality in Urban China

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Abstract

The minimum wage has been regarded as an important element of public policy in reducing poverty and income inequality. Increasing the minimum wage is supposed to raise incomes for million low-wage workers, therefore, leading to lowering income inequality. However, there is no consensus in the existing literature from industrialized countries about whether the minimum wage has contributed to lowering income inequality. Studying the impact of the minimum wage on income distribution in developing countries such as China is more complicated due to the presence of the large informal sectors in urban areas, large pools of surplus labor in the countryside, and difficulties in ensuring compliance with such legislative initiatives. China has exhibited rapid economic growth and widening income inequality in recent years. Since China promulgated new minimum wage regulations in 2004, the magnitude and frequency of changes in the minimum wage have been substantial, both over time and across jurisdictions. The growing importance of this topic of the relationship between the minimum wage and income inequality and its controversial nature have sparked heated debate in China, highlighting the importance of rigorous research to facilitate evidence-based policy making. We investigate the contribution of minimum wages to the well-documented rise in income inequality in China over the period of 2002 to 2009 using county-level minimum wage panel data and a representative Chinese household survey, finding that the increase of minimum wages has beneficial effects on the income distribution—particularly reducing the income gap between the median and the bottom decile—over the period of analysis.

Keywords: Minimum Wage, China, Income Inequality

JEL Classifications: J31, J38, O15, R23

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1. Introduction

"丘也聞有國有家者，不患寡而患不均，不患貧而患不安。"

——《論語•季氏第十六》

I have heard that people, who own countries or lands, often worry about inequality rather than deficiency, instability rather than poverty.

—— The Analects of Confucius,
Jishi the sixteenth

Since the reform and opening-up policy in 1978, China's economy has been growing remarkably at the speed of at least 9 percent per year. As the economy grows, income of Chinese workers has also increased rapidly over the same period. According to the latest figures from the National Bureau of Statistics of China, disposable income per capita has been rising substantially by more than 70 folds in 33 years in urban China, rising from 343 RMB in 1978 to 24,565 RMB in 2012; meanwhile, net income per capita in rural China has also grown by 60 times, increasing from 134 RMB in 1978 to 7,917 RMB in 2012 (National Bureau of Statistics of China 2013).

While the Chinese economy grew rapidly, however, the unbalance of income distribution has become an increasingly serious problem. For example, the urban-to-rural income per capital ratio increased from 2.57 in 1978 to 2.90 in 2001, and grew to 3.10 in 2012. The Gini coefficient, which often used to measure the degree of inequality, was at a very low level in 1978 when the numbers were .16 and .22 for urban and rural areas, respectively (Li and Zhao 1999). Since then, the Gini coefficient began to rise from .376 in 1988 to .439 in 1995 for the whole country (Wang 2007); the number further went up to .454 and .490 in 2002 and 2007, respectively (Li and Luo 2011). The National Bureau of Statistics of China also reports high inequality in 2013 (for example, .484 in 2007 and .474 in 2012).

Confucius, the great philosopher and sage of China in 2,500 years ago, had said: “To worry about inequality rather than deficiency (Confucius. The Analects of Confucius. Jishi: 16).” Income inequality undermines stability and sustainable development of a society and the economy. The deterioration of income distribution and growing gaps between rich and poor had brought challenges to the economic development and social stability in China. To improve income distribution, public polices by the government such as tax reforms can play an essential role according to the experience from developed countries. Since the early 2000s, the Chinese government had intensively promulgated a series of policies to counter the deteriorating income inequality. These include aid-to-the-poor policy, the rural minimal social security, and the minimum wage policy, etc. Among them, the minimum wage policy is the most controversial one.

In China, supporters of minimum wages advocate them as a way to assist individuals or families to achieve self-sufficiency and to protect workers in low-paid occupations. The minimum wage can help reduce inequality and serve as an important safety net by providing a wage floor. In addition, the higher labor cost may promote managerial efficiency and labor productivity, inducing employers to invest in productivity-improving technology (Cooke 2005). Along these lines, many Chinese scholars have argued in favor of the more proactive increase of minimum wages. On the other hand, opponents argue that raising the minimum wage can decrease the employment opportunities of low-wage workers and also lead to reduction in other components of the compensation package. Such regulations can undermine enterprises' dividend policies and reduce China’s comparative advantage given the abundance of low-wage labor (Cheung 2004, 2010). Furthermore, rural-urban migrant workers tend to have very low pay and

may accept jobs which pay less than the current minimum wage, making it exist in name only(Chan 2001).[2]

The minimum wage policy is contentious also because its effects—such as on employment, wages, and income distribution—cannot be easily measured. 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 since 2004. These large variations both across jurisdictions and over time facilitate our estimation of minimum wage effects on inequality in China. For example, in January 2004, China promulgated new minimum wage regulations that required local governments introduce a minimum wage increase at least once every two years, extended coverage to self-employed and part-time workers, and quintupled the penalties for 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 those of the corresponding provinces that raised the minimum wage standards for each year and its moving average over the same period.[3] Between 1995 and 2003, the average nominal minimum wage increased steadily from 169 RMB to 301 RMB, amounting to a 78% growth in 9 years. However, since China promulgated the new minimum wage regulations in 2004, the nominal minimum wage has increased rapidly by more than 200%, reaching 944

[2] Nevertheless, these two positions may not be in conflict. The minimum wage can have negative impacts but also serve those other goals advocated by its supporters. The existing evidence has shown that the minimum wage poses a tradeoff of potential benefits for some against job losses for others.

[3] There is no national minimum wage in China in which the minimum wage standards are determined at the provincial level. We discuss how we calculate the mean nominal and real minimum wages of each year in Section 4.1.

RMB in 2012.[4] The real minimum wage grew at a slower pace before 2004 and began to rise thereafter. Furthermore, as shown by the moving average curve in Figure 1, there is an apparent rise in the number of provinces that raised the minimum wage standards in 2004, indicating that minimum wage adjustments had become more frequent since that year.

[Figure 2 about here]

Figure 2 shows the trends in the effective minimum wage (defined as the differential between the minimum wage and the median in the income distribution), income inequality (standard deviation), the log difference between the top decile (p90) and the median (p50) of the income distribution as well as the log difference between the median and the bottom decile (p10). As documented by many studies, the figure shows that income inequality in China had risen gradually during the 2002-2009, peaking in 2008. Most importantly, we find that the effective minimum wage rose sharply between 2004 and 2008, whereas both income gaps (p90-p50 and p50-p10) grew substantially over the same period.

How had this regulatory environment affected the labor market outcomes in China? More specifically, did changes in the minimum wage have something to do with the deteriorating income distribution in urban China? Despite the enormous literature documenting numerous aspects of minimum wages and their role in the labor market, there is no consensus on whether the minimum wage has beneficial distributional effects (Neumark and Wascher 2008).

We first assess how and the extent to which the minimum wage changes affect the income gaps both at the bottom and upper end of the income distribution using OLS and IV panel regressions at the aggregated county-level. Our analysis shows that minimum wage increase significantly helps reduce income gaps, particularly at the bottom end of the distribution. By

[4] The growth rates of average nominal wage are 155% and 194% for the periods of 1995-2003 and 2004-2012, respectively (National Bureau of Statistics of China 2013).

probing the robustness of our results to a variety of specifications, we rule out that our results are driven by other determinants of income inequality that are spuriously correlated with changes in the effective minimum wage. For a falsification test, we do not find a statistically significant effect at the upper end of the income distribution which is consistent with most studies that the minimum wage has relatively small effects on higher deciles of the income distribution, making our results more reliable.

Next, to measure the contribution of minimum wage changes to the change in income inequality, we construct a counterfactual scenario to capture how the income distribution of China would have evolved absent the rise in minimum wages. Literally, the difference between the observed and counterfactual is the effect of the minimum wage. Indeed, we find that the contribution of minimum wage changes in reducing the inequality is substantial, particularly at the bottom end of distribution. That is, had not been the increase of minimum wages, the income gap at the bottom end would have been larger. For robustness checks, the decomposition results for Gini coefficients and the variance also suggest that the minimum wage substantially help reduce income inequality in all periods of our analysis.

The remainder of the paper is organized as follows. We briefly review the literature in Section 3 and provide a review of the development of minimum wages in China in Section 4. Section 5 provides details pertaining to the data and research design of the paper. In Section 6, we present and discuss the empirical results. Section 6 presents the paper's conclusions.

2. Literature of the Minimum Wage on Income Distribution

There is limited research regarding the effect of minimum wages on income distribution in China.[5] The first empirical study was Wen (2007) who used a pooled cross-sectional data of 2004 to 2006 at the provincial level to estimate the effect of minimum wages on employment and

[5] To the best of our knowledge, they are all written in Chinese and mostly published within last three years.

income distribution of rural migrant workers. He showed that the minimum wage had a positive effect on the employment and income distribution on rural migrants over the period of analysis. Wang (2011) discussed the effect of the minimum wage on the pattern of income distribution and economic development. He argues that the minimum wages could have beneficial distributional effects in China by possibly reducing the income gap. On the other hand, Chen (2012) used the time series data from Chongqing City between 1997 and 2010, finding that the increase of minimum wages could help mitigate the growing income gap between urban and rural areas.

In addition, Wang (2013) used the simulation method and showed that increases in minimum wage could reduce the inequality of income distribution, and the stronger the policy enforcement, the bigger the effect. Jia (2013) used micro datasets from three different surveys between 1995 and 2008 to study the effect of minimum wages on wage inequality. He found that wage inequality increase is mainly caused by latent wage inequality increase, and minimum wage only contributes to 20% of this increase. As the minimum wage to average wage ratio is relatively low, there is still large room for raising minimum wages in China.

The only study with a different view is Quan and Li (2011). They tried to test the widening income gap between urban and rural regions in Shanghai, showing that the income distribution effect of minimum wage is limited. Raising the minimum wage does no help to make the inflection point of Gini coefficient. The only way to decrease Gini coefficient is to adjust the high rapid growth of high income level by eliminating unfair affairs in the process of distribution.

Taken together, the study by Quan and Li (2011) is relatively parsimonious. In addition to estimating the effect of the increase of minimum wages on wage growth of low-income households in Shanghai, the study divides the households into low, medium low, medium, high,

and high-income households (five groups were analyzed), and then conducts the decomposition of income inequality based on wages and non-wage factors. In the final step, they simulate and forecast the outcome up to 2020. Nevertheless, the drawback of their study is that the sample is small (in Shanghai) and it is hard to apply the lessons of the study to the entire China. The common shortcomings of simulation methods mentioned above also apply—the results are based on simple assumptions. Besides, there is no clear description of how the simulation model parameters are calibrated, making their results unreliable.

Other than China, most evidence on the distributional effect of minimum wages comes from the U.S. In 1980s, research using simulation methods such as Johnson and Browning (1983) and Burkhauser and Finegan (1989) find that a moderate reduction of minimum wages could reduce income inequality. However, several critics noted that the main issue of simulation methods lies within its unrealistic hypotheses. For example, in model calibration, the effect of minimum wages on employment and related parameter values are set incorrectly or too simple. This affects the reliability of their simulation results (Neumark and Wascher 2008).

Therefore, research that uses regression methods became prevalent. Card and Krueger (1995) use the dataset of 50 states in the U.S. from 1989 to 1991 to study on the effect of minimum wages on poverty rates by difference in differences method. Their results show that the minimum wage had a significant but slight effect on poverty reduction. Addison and Blackburn (1999) use the state-level panel data from 1983 to 1996 to estimate the effect of minimum wages on state-level poverty rates, finding that among the teenagers and junior high school dropouts, the minimum wage shows a significant effect on poverty reduction. Neumark et al. (2005) apply a non-parametric method to estimate the minimum wage on income inequality, analyze several inequality measures (Gini coefficient, coefficient of variation, standard deviation,

and Atkinson index, etc.) and find that the minimum wage can increase income inequality. Taken together, the findings in the U.S. show that if the target group for the study of income distribution is at the bottom end of income distribution, the minimum wage cannot have beneficial distributional effects; instead, it could increase income inequality.

Evidence outside the U.S. is also limited and mostly focuses on Central and South American countries. World Bank (2006) finds the effects of the minimum wage on income distribution are ambiguous in Central and Southern America. There are both positive and negative effects, but the results show that the minimum wage had no impact on poverty, and the effect on income inequality varies from country to country. Neumark et al. (2006) use a before-and-after method to study whether the minimum wage can help improve income inequality in Brazil. Although they show that the minimum wage had a positive effect on income distribution in the 20th percentile, but the effects are zero in the 10th and 30th percentiles. When added a lagged minimum wage, the result shows a significant negative effect. In addition, they find the results are not robust in different model specifications. Therefore, they interpret that the evidence from Brazil shows no reduction in income inequality. Gindling and Terrell (2007) uses industry-level data from 2001 to 2004 in Honduras to study the effect of minimum wages on income distribution and find that the minimum wage has the effect on reducing poverty. However, the length of the data in their study is short and they do not consider that workers in high-tech industry are unlikely to be minimum wage workers, resulting in biased effects. Bosch and Manacorda (2010) study the effect of the minimum wage on income inequality in Mexico from the late 1980s to early 2000. They find that the Mexican minimum wage can explain a large part of income inequality and they show that at the bottom end of income distribution, most of the income inequality can be attributed to the rapid decline in the real value of minimum wages.

3. The Minimum Wage Policy in China

Prior to 1994, China had no minimum wage law. In 1984, the country simply acknowledged the 1928 "Minimum Wage Treaty" of the International Labour Organization (ILO) (Su 1993). Due to the sluggish wage growth and high inflation in the late 1980s, Zhuhai of Guangdong Province first implemented its local minimum wage regulations, followed by Shenzhen, Guangzhou, and Jiangmen in 1989. It was not until the eruption of private enterprises in 1992 when labor disputes became frequent that the Chinese Central Government began to consider the minimum wage legislation (Yang 2006). In 1993, China issued its first national 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 employers pay wages no less than the local minimum wages. All provincial, autonomous-region, and municipality governments should set their minimum wages according to five principles and report them to the State Council of the Central Government. Specifically, the five principles indicated that the setting and adjustment of the local minimum wage should synthetically consider the lowest living expenses of workers and the average number of dependents they support, local average wages, labor productivity, local employment, and levels of economic development among regions. These conditions provided considerable flexibility for provinces in setting minimum wage standards, with the economic development principle giving them the flexibility to restrain minimum wages to attract foreign investment (Frost 2002; Wang and Gunderson 2011). By December 1994, 7 of 31 provinces had set their own minimum wages. By the end of 1995, the number increased to 24.

In the early 2000s, the slow increase of the minimum wage along with growing concerns for uncovered/disadvantaged workers began to draw government's attention to consider new minimum wage regulations. In December 2003, the Ministry of Labour and Social Security

passed "The Minimum Wage Regulations" and promulgated the new law in January 2004. The main features of this law involved extending coverage to state-owned and private enterprises, employees in self-employed businesses, and private non-enterprise units. In particular, the new law established two types of minimum wages: a monthly minimum wage applied to fulltime workers and an hourly minimum wage applied to non-fulltime employees. Importantly, the minimum wage standards were set and adjusted jointly by the local government, trade union, and enterprise confederation of each province. The draft would then be submitted to the Ministry of Labour and Social Security for review, and the Ministry would ask for opinions from the All China Federation of Trade Unions and the China Enterprise Confederation. The Ministry of Labour and Social Security can request a revision within 14 days after receiving the proposed draft. If no revision is brought up after the 14-day period, the proposed new minimum wage program is considered to be passed.

In addition, the new regulation required local governments to renew the minimum wage standards at least once every two years, and penalties for violation were increased from 20% to 100% of the owed wage to 100% to 500% of the owed wage.[6] Employers cannot 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 on March 1st, 2004 and led to substantial increases in minimum wages.

4. Data and Research Design

Though there is high interest in learning the effect of minimum wages on income inequality, research in this topic has been hampered by difficulties in collecting data. First, because

[6] This has affected compliance significantly. According to our calculation using 2002-2009 data, over the country the share of workers who earn less than the minimum wage declined continuously, reducing from 7.28 to 5.62% in the pre- and post-2004 periods (2002-2003, 2004-2009), respectively. In particular, the number decreased from 8.08 to 5.33% in the Eastern region between the same periods; whereas in the Central region, the number decreased from 6.19 to 5.46%.

provinces, municipalities, and autonomous regions in China have considerable flexibility in setting their minimum wage according to local conditions, there are often at least 3 or 4 levels of minimum wage standards applicable to various counties in most provinces.[7] The fact that each county is responsible for documenting its own minimum wage standards, indicating 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.[8] Second, in China, it is difficult to find microdata that can be plausibly representative of the population and may be influenced by minimum wage increases. Furthermore, some provinces, such as Beijing and Shanghai, do not include social security payments and housing provident funds as part of wages when calculating the minimum wage, making their "official" minimum wage virtually higher.[9]

The data collection and research design were motivated by a desire to estimate the average effect of minimum wages on income inequality 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 level over a long time span, with a panel structure allowing for the use of fixed time and county effects to eliminate omitted variable bias arising from unobserved variables that are constant over time and those that are constant across counties. The income

[7] For expositional convenience, we refer to "provinces, municipalities, and autonomous regions" as provinces.

[8] The implementation date of a new minimum wage standard of a county can also differ across geographically contiguous neighbors within the same province. For example, Liaoning Province has the most complicated minimum wage scheme, in which 14 jurisdictions may enact their own standards on different dates. For instance, in 2007, Shenyang, Benxi, Dandong, and Panjin cities did not increase their minimum wages. In contrast, Dalian and Anshan cities increased their minimum wages from 600 RMB to 700 RMB on December 20th, on which day Jinzhou and Liaoyang cities increased their minimum wages from 480 RMB to 580 RMB and Chaoyang city increased its minimum wage from 35 0RMB to 530 RMB. Furthermore, the minimum wages of Fushun and Huludao cities increased from 400 RMB to 480 RMB on January 1st, whereas that of Yingkou city increased from 380 RMB to 480 RMB, that of Fuxin city increased from 350 RMB to 420 RMB, and that of Tieling city increased from 380 RMB to 420 RMB the following year. As such detailed minimum wage data by county are not readily available to the public, we took effort to collect the data by ourselves.

[9] 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 were 651 RMB and 767 RMB in 2004-2009; however, the average expenses of both social security payments and housing provident funds in Beijing and Shanghai are as high as 376 RMB and 452 RMB over the same period, amounting to 58% and 59% of the nominal minimum wages, respectively. We discuss how we address this issue in the Data section.

sample needed to be a longitudinal microdata sample to allow the distribution of minimum wage workers to be estimated. For these reasons, and because the paper also aimed to examine how the Great Recession influenced our results, we sought to collect information on provinces that were potentially affected over as many years as possible.

4.1. *Data*

Our study primarily uses two data sources: the annual Urban Household Survey (UHS) from 2002 to 2009 and minimum wage data collected at the county level (6-digit area code) between 1994 and 2012.[10] The UHS is a continuous, large-scale social-economic survey conducted by the National Bureau of Statistics of China (NBS) 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. With the use of sampling techniques and daily accounting methods, the survey collects data from households in different cities and counties over all 31 provinces in Mainland China for each quarter. In late December, survey teams of all provinces are required to verify and then upload the aggregated annual data to the Division of City Socio-economic Survey of NBS through intranet by January 10th of the following year. The UHS contains household information, such as income and consumption expenditure; demographic characteristics; work and employment; housing; and other family-related matters.

Note that the UHS is not publicly available and the NBS allows limited access to the microdata up to 16 provinces under certain conditions for academic research. Despite that, the 16-province sample includes most economically important provinces in mainland China as shown in the Appendix Table 1. Provinces contained in our sample are represented by darker

[10] The commonly-used administrative area code in China is 6 digits. The first two digits identify a provincial administrative unit; the first four digits identify a prefectural administrative unit; whereas the six digits identify an administrative unit at the county level.

areas, which include two major municipalities, Beijing and Shanghai, and four economically important provinces, Guangdong, Jiangsu and Shandong in the East China; Liaoning and Heilongjiang represent the northeastern region; five developing provinces in the Central China are Henan, Anhui, Hubei, Jiangxi, and Shanxi. Finally, the Western region covers the only municipality in the West, Chongqing, and three less developed provinces: Gansu, Sichuan, and Yunnan. Collectively, our 16-province sample contains 65% of the total population in China, covering 60% of the counties in the country (National Bureau of Statistics of China 2010).

Our primary objective was to thoroughly and accurately acquire relevant information on the minimum wage for each county. In China, provinces have considerable flexibility in setting their minimum wage standards according to local economic conditions, resulting in several levels of standards across counties/cities within the same province. Moreover, the adjustment date of a county's new minimum wage standard can also differ from its geographically contiguous neighbors within the same province, making the estimation of minimum wage effects more challenging. To effectively address this issue, we collected our minimum wage data from every local government website and carefully recorded the minimum wage information for approximately 2,000 counties every year from 1994 to 2012. As such, our data contain monthly minimum wages for full-time employees, hourly minimum wages for part-time employees, the effective dates of the minimum wage standards and the extent to which social security payments and/or housing provident funds were included as part of the minimum wage calculations. We then merge the minimum wage data into the UHS, a 16-province dataset that contains individual/household socio-economic information over the 2002-2009 period.

[Table 1 about here]

We restrict our analysis to the disposable income per capita of each household as many studies do, and account for the differing living costs among provinces by applying the PPP-adjusted deflator developed by Brandt and Holz (2006).[11] To reduce the effect from outliers, we winsorize the top two percentiles of the income distribution in each county-year group by assigning the value of the 97th percentile to the 98th and 99th percentiles. Sampling weights are used in all calculations.

Table 1 presents summary statistics of the key variables over the country and in each region—namely, log monthly minimum wages, the first (p10), median (p50) and ninth (p90) deciles of the log annual income distribution as well as the effective minimum wage—from 2004 to 2009. The table shows that the log minimum wage rose continuously (with a .61 log points increase) between 2004 and 2009, whereas the annual income at the bottom distribution (first decile) only grew .38 log points. For the median and the ninth decile of the income distribution, the increases are .50 and .54 over the same period, respectively. In short, the fact indicates that the minimum wage had increased faster than the income after 2004. In particular, these numbers show that income at the bottom end of the distribution had grown slower than that at the top end.

Looking at the effective minimum wage—our key variable—in the last row of Table 1. The rising trend of the effective minimum wage is apparent for the country and for the three regions. For example, the effective minimum wage (log points) improved steadily from -1.780 in 2004 to -1.674 in 2008 for the county (except 2009).[12] Although the number of the Eastern region increased from 2004 to 2005, decreased in 2006 and 2007, then rose again in 2008, an upward trend was noted. For the Central and the Western regions, both effective minimum wages increased year by year over the 2004-2008 period. As anticipated, the more prosperous Eastern

[11] The updated version which extended to year 2010 is at http://ihome.ust.hk/~socholz/SpatialDeflators.html.
[12] Note that there was no increase in minimum wages in 2009 for the whole country due to the Great Recession, so that the effective minimum wage declined in that year.

region has the highest effective minimum wage (in absolute value) of the three regions in each year, and then followed by the West and the Central.[13]

[Table 2 about here]

We also provide a summary of the characteristics of minimum wage standards in China over 2004-2009 in Table 2. The first row of Table 2 shows that approximately 5.62% of all workers earned less than the minimum wage and 3.28% earned just the minimum, meaning that a combined 8.90% of Chinese employees are minimum wage workers over the 2004-2009 period. Among those who earned the minimum wage exactly and less than the minimum wage, 63.84% and 61.52% are females, respectively. Furthermore, the minimum-to-average-wage ratio of workers receiving less than the minimum wage is 2.52, meaning that these disadvantaged workers earn a wage that is only approximately one-quarter of the official standard.

For different age cohorts, Table 2 shows that young adults (age 15-29) are more likely to be minimum wage workers. With increase age, the percentage decreases. Similarly, we find the same decreasing pattern in the skill panel. Looking at the characteristics of workers by industry, Table 2 shows that the housekeeping sector has the largest share of minimum wage workers: approximately 20.21% of housekeepers earn less than or equal to the minimum wage. Wholesales and retail sales as well as hotel and restaurant sectors also have 16.76% and 16.50% of workers earning below or equal to the minimum wage, respectively.

4.2. *Research Design*

Our objective is to assess the impact of minimum wages on the income distribution. As noted in Section 1, nearly all existing studies on minimum wages in China use pooled time-

[13] The minimum wage in Table 1 accounts for the fact that some provinces include social security payments and/or housing provident funds as part of the wage when calculating minimum wages. The minimum wages in Beijing, Shanghai and Jiangxi do not include social security payments and housing provident funds, and the minimum wages in Jiangsu began to include only social security payments (but not housing provident funds) on November 1st, 2005.

series/cross-section data at the provincial level and tend to find mixed results, implying that a "consensus" of distributional effects remains to be established. Thus, our study attempts to reconcile the existing findings using detailed/complete minimum wage data, which permit the use of a panel structure analysis of minimum wage effects, exploiting the greater variation in relative minimum wages at the county level and avoiding the measurement error caused by using a uniform provincial minimum wage. Moreover, unlike previous studies that use aggregate published statistics, our study uses household survey microdata, which allows us to calculate the dependent variable—the income differentials—at the county level, which contains more variation and information on local conditions. Ideally, this feature should yield more reliable estimates of the distributional effects of minimum wages in China.

To more accurately estimate the distributional effects of minimum wages, our analysis use the county-level minimum wage (over 2,000 counties) and the UHS microdata from 16 representative provinces. Specifically, our panel data allow us to estimate an reduced form equation proposed in Lee (1999) and used in Autor et al. (2014) and Bosch and Manacorda (2010). Assume that w_{ct}^{q} is the q-th percentile of the log income distribution in county c at time t and w^{*q}_{ct} is the latent percentile, i.e., the one that would have been observed in the absence of the minimum wage. If there exists a sufficiently high percentile p, such that income at this percentile or higher percentiles are unaffected by the minimum wage, that is, $w_{ct}^{s} = w^{*s}_{ct}$, $s \geq p$. Bosch and Manacorda (2010) shows that the censoring model implies that the log p to q income differential can be represented as:

$$\begin{aligned} w_{ct}^{q} - w_{ct}^{p} &= w^{*q}_{ct} - w^{*p}_{ct}, \ \text{ if } \ w^{*q}_{ct} \geq MW_{ct} \\ w_{ct}^{q} - w_{ct}^{p} &= MW_{ct} - w^{*p}_{ct}, \ \text{ if } \ w^{*q}_{ct} < MW_{ct}, \end{aligned} \tag{1}$$

where MW_{ct} is the log of nominal minimum wage in county *c*. Eq.(1) indicates that the actual *q* to *p* percentile differential in the log income distribution in county *c* at time *t* equals its latent differential if the latent *q*-th percentile is higher or equal to the minimum wage of county *c* at time *t*. Otherwise, the actual *q* to *p* percentile differential equals the minimum wage and the *p*-th percentile if the latent *q*-th percentile is less than the minimum wage.

Following Lee (1999) and Autor et al. (2014), we parameterize the minimum wage effect as a quadratic function of the difference between the log minimum wage and the *p*-th percentile of the actual log income distribution by expressing the *q* to *p* percentile differential $w_{ct}^q - w_{ct}^p$ in Eq.(1) as a function of latent wage differential plus a minimum wage effect. That is, our estimation equation is

$$w_{ct}^q - w_{ct}^p = \beta_1^q (MW_{ct} - w_{ct}^p) + \beta_2^q (MW_{ct} - w_{ct}^p)^2 + X_{ct}'\gamma^q + \alpha_c^q + \alpha_t^q + u_{cqt}, \qquad (2)$$

where $MW_{ct} - w_{ct}^p$ is the "effective" minimum wage variable of county *c* in year *t*, showing that the minimum wage relative to some level of local income that is unaffected by the minimum wage and that proxies for local living standards. We include $(MW_{mt} - w_{mt}^p)^2$ in the equation to capture the property that $w_{ct}^q - w_{ct}^p$ exhibits "flatten to the left" as shown in Lee (1999); X is a set of control variables to capture aggregate business cycle effects; α_t^q is a set of fixed year effects; and α_c^q is a set of fixed county effects. The disturbance term u 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 per capita and CPI (city level) capture aggregate business cycle effects and controls for the Great Recession. Second, the county foreign direct investment (FDI) is used to control for that provinces may

restrain the minimum wage to attract foreign investors (Frost 2002). Because the decisions of whether to increase minimum wages are determined by government officials, who often must consider local economic conditions, we collectively include these controls to address this issue.

4.3. *Decomposing Changes in Income Inequality*

To measure the contribution of the increase in the effective minimum wage to the observed rise in China's income inequality over the period of analysis, we decompose the total change in China's income distribution, at several decile differentials, into the sum of two effects: 1) The minimum wage effect; and 2) The effect other than the minimum wage.

Conceptually, we want to construct a counterfactual scenario which captures how the income distribution of China would have evolved absent the rise in minimum wages. That is, we construct counterfactual distributions to ask what the income distribution of China would be if, for instance, the effective minimum wage in 2009 was the same as in 2004, but the wage/income structure in 2009 prevailed. To calculate the effect from minimum wage changes, it is simply the difference between the observed and counterfactual distributions.

One approach to such counterfactual analysis that consists in reweighting the observations using the propensity score is developed by DiNardo et al. (1996). In their influential paper, DiNardo et al. (1996) apply a semiparametric method to obtain counterfactual densities and use these to analyze the effects of institutional and labor market factors on the U.S. wage distribution between 1979 and 1988. They find that the decline in the real value of the minimum wage over the 1979-1988 period has a large impact on the U.S. wage distribution, explaining up to 25 and 30 percent in the standard deviation of men's and women's log wages, respectively. Instead of using reweighing functions, Chernozhukov et al. (2013) complement the method in DiNardo et al. (1996) and, most importantly, provide standard errors for the estimates of those contributing

effects. The use of standard errors—which was previously ignored in many decomposition analyses in economics—allows us to unravel the economic significance of diverse effects from the statistical uncertainty (Chernozhukov et al. 2013).

We apply the decomposition method in Chernozhukov et al. (2013) and define "1" as the target year (such as 2009) and "0" as the reference year (such as 2004). Let Y_t be the disposal income per capita and X_t be job market characteristics for years $t=1$ and $t=0$. We define the conditional distribution functions $F_{Y_0|X_0}(y\,|\,x)$ and $F_{Y_1|X_1}(y\,|\,x)$ as the stochastic assignment of income to workers with characteristics x for years 0 and 1, respectively. Suppose $F_{Y\langle 0|0\rangle}$ and $F_{Y\langle 1|1\rangle}$ are the observed income distribution functions of for years 0 and 1, then $F_{Y\langle 0|1\rangle}$ represent the counterfactual income distribution function—the one that would have prevailed for year 1 had year 1 faced year 0's minimum wage level $F_{Y_0|X_0}$. That is, the counterfactual distribution is defined as:

$$F_{Y\langle 0|1\rangle}(y) := \int_{\chi_1} F_{Y_0|X_0}(y\,|\,x)dF_{X_1}(x). \tag{3}$$

Namely, we construct the counterfactual distribution by integrating the conditional distribution of income for year 0 with respect to the distribution of characteristics for year 1. And the quantity is well-defined if χ_0 the support of year 0's characteristics contains the support of year 1', i.e., $\chi_1 \subseteq \chi_0$.

Next, given the counterfactual distribution in Eq.(3), we decompose the observed change in income distribution between year 0 and year 1 (e.g., 2004 and 2009) into:

$$\underbrace{F_{Y\langle 1|1\rangle} - F_{Y\langle 0|0\rangle}}_{\text{Total change}} = \underbrace{[F_{Y\langle 1|1\rangle} - F_{Y\langle 0|1\rangle}]}_{\text{Due to changes in the minimum wage}} + \underbrace{[F_{Y\langle 0|1\rangle} - F_{Y\langle 0|0\rangle}]}_{\text{Due to changes in labor market characteristics}}. \tag{4}$$

The first term on the right hand side of Eq.(4) estimates the contribution of minimum wage changes to the total change in income distribution between year 0 and year 1, whereas the second term captures the contribution of labor market characteristics. In estimating these conditional distributions, we use quantile regression as suggested by Chernozhukov et al. (2013).

5. Empirical Results and Discussion

5.1. *Minimum Wage Effects on Income Differentials*

We first present the estimation results of minimum wage effects on income differentials in Table 3. In each column, we estimate Eq. (2) using the fixed-effects model with four different specifications. All regressions are weighted by the size of county population and standard errors in parentheses are clustered at the county level. Entries in the tables refer to the estimated first derivative (marginal effect) of each dependent variable with respect to the effective minimum wage evaluated at the population-weighted average across counties and years.[14] Besides OLS, we also use 2SLS regression to address potential endogeneity issues. In 2SLS regressions, we instrument the observed effective minimum wage and its square using three instruments: 1) the log of the real minimum wage, 2) the square of the log of the real minimum wage, and 3) the interaction between the log minimum wage and average log median real wage for the county over the sample period.

[Table 3 about here]

We report the OLS and 2SLS results in terms of marginal effects of four specifications for each percentile gap. In particular, we estimate the effects for four different time periods: pre-2004 (2002-2004), post-2004 (2004-2008, 2004-2009), and the entire sample period (2002-2009). Each entry refers to a separate regression, where each row refers to the differential between consecutive deciles of the income distribution and the median.[15] The first column of Table 3 reports the estimates with cluster-robust standard errors at the county level in parentheses for the specification using fixed year and county effects. In the second column, we report the estimates of the specification with both fixed year and county effects and the interaction of county and year

[14] That is, each entry means $\beta_1^q + 2\beta_2^q(MW - w^p)$ in which variables without the *ct* subscript refer to sample means over all counties and all periods.

[15] For all 2SLS models, our F-tests (statistics not tabulated) show that the instruments are jointly highly significant and pass standard diagnostic tests for weak instruments as suggested in Stock et al. (2002).

dummies. This allows us to abstract from the differential changes in the minimum wage and latent wages across counties. The estimation of the third column further contains county trends, whereas in the fourth column we additionally include county covariates to control for the local economic conditions and business cycle effects.

The significance of our results is compelling: over all, we find that the minimum wage can reduce the income gaps between the median and the 5th, 10th and 25th percentiles of the income distribution at the bottom end; on the contrary, as a falsification test we do not find a statistically significant effect at the upper end (such as p75-p50 and p90-p50). For example, in column (1) of OLS results in the 2004-2009 period, a 10% increase in the effective minimum wage led to statistically significant 1.73%, 1.48%, and 1.37% reductions in the gap between the median and the 5th, 10th and 25th percentiles of the income distribution; whereas the marginal effects of 2SLS also show statistically significant 2.28%, 2.11%, and 1.64% reductions over the same period. As expected, the point estimates tend to become smaller at the higher percentile (e.g. 25th) than the lower one (e.g., 10th), implying some spillovers but the effect attenuates as moving up the income distribution ladder. Note that the OLS results at the upper end (p75-p50 and p90-p50) are statistically significant, but the effects turn insignificant in all 2SLS results. In addition, the numbers are all statistically insignificant for higher percentiles, suggesting the minimum wage do not have effects on income above the median.

In column (2) of Table 3, we additionally control for the interaction of year dummies with county dummies. By including county-year interaction fixed effects, we control for county-specific factors that have been shown to be important predictors of changes in the income structure. These regressions effectively identify the effect of the minimum wage based on its differential variation across counties. Compared to column (1), the results of column (2) show

stronger beneficial minimum wage effects on income distribution by reducing the income gaps at the bottom end.

Column (3) of Table 3 additionally controls for county specific linear time trends. Point estimates increase in absolute value at all percentils, implying that counties that experienced a larger increase in inequality also experienced a larger increase in the effective minimum wage. Point estimates are statistically significant up to the median and are insignificant afterward, implying pronounced spillover effects of the minimum wage that propagate to higher percentiles of the income distribution at the bottom but not the upper end. Estimates in column (3) suggest, for example the 2SLS result in 2004-2009 period, that a 10% increase in the effective minimum wage reduces the income gap between the median and the 10th percentile by almost 2.64% and the 25th decile by 1.94%, respectively.

Potential concerns for the results in the previous columns are that the correlation between income inequality and the minimum wage might be contaminated by the opening of the Chinese economy after becoming an official member of WTO in December of 2001, combined with soaring FDI, which others claim contributed to shaping the trends in income inequality. To address these possible issues, we additionally control for the factors that might be correlated with the trend in the effective minimum wage. Point estimates that include these additional controls are presented in column (4) of Table 3 and are remarkably similar to those in column (3) and more than those in columns (1)and (2). Except for the pre-2004 period (e.g., 2002-2004), we find that all estimates are statistically significant, suggesting our findings that minimum wage changes have beneficial effects on income inequality in China by essentially reducing income gaps at the bottom end of the income distribution.

5.2. *Results of Decomposing the Changes in Income Inequality*

We present the decomposition results in Table 4 using Eq.(4). To thoroughly investigate the changes in income inequality in China, we use several different measures and time periods as shown in the first and second columns. The inequality measures include income gaps between median and several percentiles of the income distribution, Gini coefficients, and the variance. We also separate our sample into pre- and post-2004 period as well as the entire from 2002 to 2009. Estimates of the total change during each time period are reported in the third column. The two contributing effects—due to changes in the minimum wage and changes in labor market-related characteristics—are reported in the fourth and fifth columns, respectively. Bootstrapped standard errors with 100 repetitions are given in parentheses.

[Table 4 about here]

For all inequality measures, we observe statistically significant increases in income inequality in every time period, which is consistent with the trend in Figure 2. Besides, our main interest is to examine the effect of the minimum wage at both the top and the bottom of the distribution, especially the latter. First looking at the effects of the minimum wage on income inequality at the bottom of the distribution (p50-p5, p50-p10, and p50-p25): except pre-2004 period, we find that changes in the minimum wage help reduce the income gaps in all time periods and the estimates are statistically significant. On the other hand, changes in labor market characteristics significantly increase the income gaps (except for p50-p25 in 2002-2004 period). For example, while the income gap of the median and the 10th percentile (p50-p10) grew .060 log points from 2004 to 2008, changes in the minimum wage during this period reduce the differential by .082 log points whereas changes in labor market characteristics (factors other than the minimum wage) increase the gap. Likewise, estimates of p50-p5 and p50-p25 show similar

results. In short, our decomposition results suggest that the increase in the minimum wage helps reduce a substantial part of the rise in income gap at the bottom of the distribution.

On the contrary, though income gaps at the upper end of the distribution (such as p75-p50 and p90-p50) increase as well in every time period, the minimum wage does not help to reduce the differential and seems to increase the gap in some cases. For example, the estimates of the minimum wage effect for p75-p50 in the fourth column are statistically insignificant except for the 2004-2009 period, whereas those for p90-p50 are not statistically significant for the two post-2004 periods but significant for 2002-2004 and 2002-2009 periods, implying that the minimum wage may have spillover effects and contributions of the minimum wage seem to be mixed at the upper end of the distribution.

Finally, we examine Gini coefficients and the variance for the four time periods and report the results at the bottom of Table 4. Not surprisingly, the two measures both show statistically significant increases in income inequality. By decomposing the estimates, we find that changes in the minimum wage consistently and significantly help reduce income inequality in all time periods. Most importantly, the results that the contributions of the minimum wage are substantial, consistent with our findings in Section 5.1 that the minimum wage policy plays an notable role in reducing income inequality in China, especially after the promulgation of the new minimum wage regulations in 2004.

In sum, our decomposition results based on several different specifications convey a similar message. The increase in the effective of the minimum wage appears to have beneficial effects on income distribution by reducing the income gap at the bottom and overall distribution of income in China over our sample of analysis.

6. Conclusions

We use a large set of panel data at the county level that contains relevant information on minimum wages, combined with a longitudinal household survey of 16 representative provinces, to estimate the distributional effect of minimum wage changes in China over the 2002 to 2009 period. Compared to previous studies using provincial-level data and reporting mixed results, we show that minimum wage changes significantly help reduce the income gap at the bottom end of the income distribution. For a falsification test, we do not find minimum wage changes have an effect on the income gap at the upper end of the distribution over the same period.

To gauge the contribution of minimum wage increases in reducing the income inequality, we decompose the total change in China's income distribution. Indeed, we find that minimum wage changes contribute substantially to reduce the income gap at the bottom end of distribution, especially in the post-2004 period. Likewise, the results for Gini coefficients and the variance also suggest that the minimum wage help reduce income inequality in all periods of our analysis.

In sum, our findings are consistent with recent studies that minimum wages play an essential role in earnings/wage inequality. In the U.S. and Mexico, both countries exhibit declining minimum wages (whatever real or effective) and rising inequality. Empirical evidence shows that the declining minimum wage accounts for a substantial part of the growth in inequality in both countries over the past three decades (Lee 1999; Bosch and Manacorda 2010; Autor et al. 2014). On the other hand, China experiences rapid increase in the minimum wage and rising fast inequality in the past 10 years which provides an opportunity to study the effect of the minimum wage on inequality in a contrasting environment (e.g., U.S. and Mexico). Our findings that minimum wage increases have beneficial effects on income distribution—by reducing income gaps, particularly, at the bottom end—provide both regional relevance and general implication, viewed in the context of the minimum wage literature.

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Table 1 Minimum Wages and Income in China, 2004–2009

	Year	Region			
		All	East	Central	West
Log Annual Minimum Wage	2009	8.81	8.92	8.75	8.77
	2008	8.72	8.84	8.64	8.69
	2007	8.56	8.70	8.51	8.51
	2006	8.46	8.61	8.38	8.42
	2005	8.37	8.53	8.29	8.33
	2004	8.20	8.32	8.13	8.19
First Decile—Log Annual Income Distribution	2009	10.37	10.44	10.34	10.28
	2008	10.33	10.42	10.25	10.28
	2007	10.27	10.31	10.24	10.28
	2006	10.17	10.18	10.16	10.19
	2005	10.06	10.05	10.05	10.06
	2004	9.99	9.96	10.02	10.04
Median—Log Annual Income Distribution	2009	10.79	10.95	10.71	10.73
	2008	10.77	10.92	10.69	10.71
	2007	10.65	10.80	10.59	10.59
	2006	10.46	10.59	10.41	10.44
	2005	10.37	10.47	10.32	10.37
	2004	10.29	10.43	10.24	10.31
Ninth Decile—Log Annual Income Distribution	2009	11.13	11.26	10.91	10.96
	2008	11.13	11.25	10.93	10.94
	2007	10.98	11.12	10.79	10.78
	2006	10.79	10.98	10.58	10.59
	2005	10.68	10.88	10.47	10.50
	2004	10.59	10.77	10.39	10.48
Effective Minimum Wage	2009	-1.742	-1.810	-1.729	-1.770
	2008	-1.674	-1.729	-1.673	-1.690
	2007	-1.710	-1.771	-1.711	-1.741
	2006	-1.731	-1.757	-1.778	-1.757
	2005	-1.735	-1.703	-1.805	-1.779
	2004	-1.780	-1.833	-1.814	-1.823
Observations		8,023	2,423	3,305	2,295

Note: the effective minimum wage is defined as the log of annual minimum wage minus the log of median annual income distribution. Observations represent the number of households.

Table 2 Characteristics of Minimum Wage Standards in China, 2004–2009

Variable	Less than Minimum	Minimum	Above Minimum
Percent of Total (%)	5.62	3.28	91.09
Percent of Female (%)	61.52	63.84	42.99
Minimum/Average Wage	2.52	1.00	.35
	(4.66)	(.06)	(.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	.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 Retail Sales	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	.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. There are 620,321 salaried workers aged 15-64 in this period. "Less than the Minimum" are workers earning wages at or below 90 percent of the minimum wage. Minimum wage workers earn wages above 90 percent and up to 110 percent of the minimum wage. Above minimum wage workers earn wages above 110 percent of the minimum wage.

Table 3 Marginal Effects of the Minimum Wage on Income Differentials

		(1)		(2)		(3)		(4)	
		OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
p50–p5	2004-2008	-.134***	-.170	-.297***	.168	-.037	-.551***	-.054	-.568***
		(.049)	(.112)	(.069)	(.374)	(.171)	(.228)	(.175)	(.231)
	2004-2009	-.173***	-.228**	-.375***	-.027	-.269***	-.155***	-.274***	-.156***
		(.044)	(.103)	(.055)	(.298)	(.074)	(.063)	(.076)	(.074)
	2002-2004	.012	.036	-.479***	-.482***	-.334*	-.325	-.333	-.161
		(.150)	(.135)	(.155)	(.153)	(.201)	(.220)	(.228)	(.280)
	2002-2009	-.077	-.106	-.333***	-.177	-.324***	-.244**	-.339***	-.248*
		(.074)	(.098)	(.057)	(.157)	(.067)	(.122)	(.069)	(.137)
p50–p10	2004-2008	-.130***	-.177	-.409***	-.070	-.403***	-.884***	-.402***	-.841***
		(.042)	(.142)	(.058)	(.252)	(.106)	(.385)	(.108)	(.371)
	2004-2009	-.148***	-.211*	-.425***	-.168	-.410***	-.264***	-.398***	-.261***
		(.039)	(.122)	(.048)	(.200)	(.062)	(.110)	(.065)	(.074)
	2002-2004	-.053	-.005	-.460***	-.452***	-.276**	-.270**	-.244	-.151
		(.078)	(.092)	(.105)	(.111)	(.128)	(.125)	(.154)	(.161)
	2002-2009	-.082*	-.115	-.394***	-.245*	-.408***	-.290**	-.407***	-.294**
		(.045)	(.093)	(.049)	(.133)	(.047)	(.134)	(.049)	(.142)
p50–p25	2004-2008	-.142***	-.162**	-.301***	-.124	-.331***	-.767*	-.332***	-.912**
		(.026)	(.076)	(.029)	(.136)	(.062)	(.436)	(.063)	(.449)
	2004-2009	-.137***	-.164**	-.425***	-.162	-.296***	-.194*	-.285***	-.185***
		(.024)	(.066)	(.048)	(.124)	(.037)	(.117)	(.038)	(.022)
	2002-2004	-.089**	-.042	-.322***	-.309***	-.305***	-.305***	-.266***	-.361**
		(.036)	(.069)	(.070)	(.087)	(.081)	(.116)	(.086)	(.157)
	2002-2009	-.089***	-.106	-.285***	-.196**	-.318***	-.216*	-.309***	-.210*
		(.021)	(.053)	(.031)	(.088)	(.031)	(.114)	(.031)	(.118)
p75–p50	2004-2008	.262***	.301	.428***	.189	.453	.787	.449	-.760
		(.126)	(.201)	(.235)	(.125)	(.463)	(.663)	(.362)	(.655)
	2004-2009	.301***	.356	.450***	.306	.503	.431	.493	.423
		(.124)	(.296)	(.230)	(.320)	(.442)	(.683)	(.443)	(.386)
	2002-2004	.178	.089	.485	.471	.472	.474	.492	.535
		(.237)	(.122)	(.573)	(.400)	(.481)	(.688)	(.422)	(.306)
	2002-2009	.231***	.165	.426***	.228	.504	.360	.499	.359
		(.125)	(.267)	(.228)	(.300)	(.435)	(.586)	(.636)	(.387)
p90–p50	2004-2008	.384***	.329	.663***	.249	.760	1.166	.756	-1.156
		(.137)	(.300)	(.258)	(.191)	(.675)	(.893)	(.677)	(.95)
	2004-2009	.444***	.515	.653***	.273	.809	.550	.816	.657
		(.134)	(.424)	(.246)	(.176)	(.655)	(.542)	(.657)	(.577)
	2002-2004	.256	.159	.639	.604	.668	.673	.585	.708
		(.250)	(.146)	(.589)	(.740)	(.577)	(.572)	(.428)	(.635)
	2002-2009	.353***	.279	.628***	.314	.766	.466	.759	.446
		(.034)	(.383)	(.142)	(.241)	(.649)	(.367)	(.651)	(.477)
County Fixed Effects		Yes		Yes		Yes		Yes	
County×Year (interactions)				Yes		Yes		Yes	
County Trends						Yes		Yes	

County Controls	Yes

Note: *** statistically significant at the 1 percent level; ** at the 5 percent level; * at the 10 percent level. Cluster-robust standard errors at the county level are in parentheses. Entries in the tables refer to the estimated first derivative of each dependent variable with respect to the effective minimum wage evaluated at the sample mean which is $\beta_1^q + 2\beta_2^q(MW - w^p)$, where variables without the *ct* subscript refer to sample means over all counties and all periods.

Table 4 Results of Income Inequality Decomposition

	Period	Total Change	Due to (1) Changes in the Minimum Wage	Due to (2) Changes in Labor Market Characteristics
p50–p5	2004-2008	.069***	-.149***	.218***
		(.009)	(.015)	(.014)
	2004-2009	.060***	-.147***	.207***
		(.008)	(.017)	(.017)
	2002-2004	.038***	-.013	.051***
		(.009)	(.011)	(.010)
	2002-2009	.099***	-.217***	.316***
		(.008)	(.019)	(.018)
p50–p10	2004-2008	.060***	-.082***	.143***
		(.007)	(.012)	(.012)
	2004-2009	.058***	-.092***	.150***
		(.007)	(.012)	(.013)
	2002-2004	.019***	-.003	.022***
		(.007)	(.009)	(.009)
	2002-2009	.077***	-.110***	.187***
		(.007)	(.016)	(.015)
p50–p25	2004-2008	.025***	-.049***	.074***
		(.006)	(.011)	(.010)
	2004-2009	.031***	-.044***	.076***
		(.006)	(.010)	(.010)
	2002-2004	.016***	.011	.005
		(.007)	(.008)	(.007)
	2002-2009	.047***	-.031***	.079***
		(.006)	(.013)	(.012)
p75–p50	2004-2008	.043***	.008	.035***
		(.006)	(.013)	(.013)
	2004-2009	.046***	.043***	.003
		(.005)	(.012)	(.012)
	2002-2004	.017***	.010	.008
		(.007)	(.008)	(.007)
	2002-2009	.063***	-.008	.071***
		(.006)	(.014)	(.013)
p90–p50	2004-2008	.027***	.014	.013
		(.006)	(.024)	(.023)
	2004-2009	.019***	-.003	.022
		(.006)	(.026)	(.025)
	2002-2004	.036***	.038***	-.001
		(.007)	(.009)	(.009)
	2002-2009	.055***	.111***	-.056***
		(.007)	(.013)	(.012)
p90–p10	2004-2008	.087***	-.068***	.156***

		(.010)	(.029)	(.028)
	2004-2009	.077***	-.095***	.171***
		(.008)	(.033)	(.032)
	2002-2004	.055***	.035***	.020
		(.010)	(.012)	(.012)
	2002-2009	.132***	.001	.131***
		(.009)	(.020)	(.019)
Gini coefficient	2004-2008	.011***	-.050***	.061***
		(.003)	(.012)	(.014)
	2004-2009	.004***	-.050***	.055***
		(.002)	(.013)	(.012)
	2002-2004	.012***	-.026***	.037***
		(.002)	(.008)	(.010)
	2002-2009	.016***	-.056***	.072***
		(.005)	(.014)	(.018)
Variance	2004-2008	.034***	-.069***	.103***
		(.006)	(.012)	(.013)
	2004-2009	.022***	-.069***	.091***
		(.002)	(.013)	(.013)
	2002-2004	.020***	-.035***	.055***
		(.002)	(.012)	(.013)
	2002-2009	.042***	-.075***	.117***
		(.008)	(.025)	(.029)

Note: All numbers are in log points. Bootstrapped standard errors with 100 repetitions are given in parentheses. Income gaps, Gini coefficients and variances are calculated at household level.

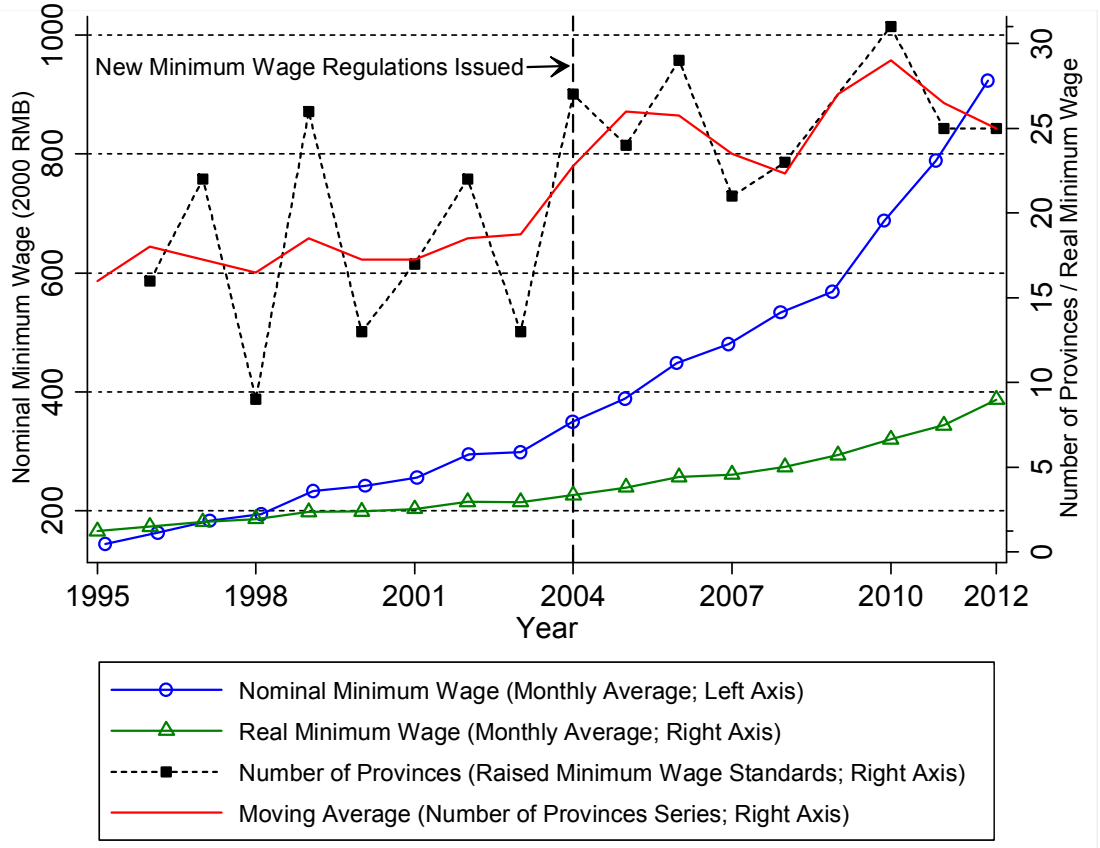

Figure 1 Minimum Wages in China, 1995−2012

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

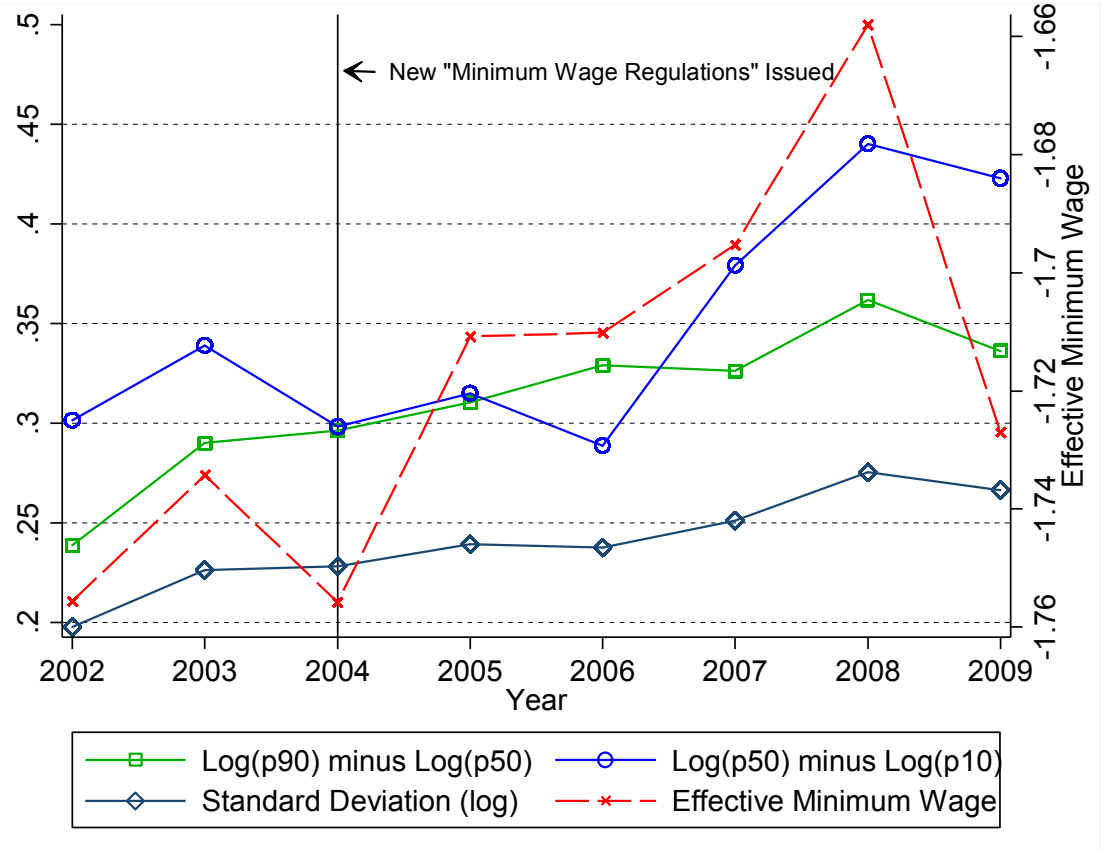

Figure 2 Trends in the Effective Minimum Wage, 90−50 and 50−10 Log Income Differentials, and Income Inequality in Urban China, 2002−2009

The effective minimum wage is defined as the log difference between the minimum wage and the median (p50) of the income distribution. In 2009, there was no increase of the minimum wage in China due to the Great Recession.

Appendix Table 1 Coverage of the UHS Sample in Mainland China

The dark area represents those 16 provinces contained in our sample, whereas the light area is not contained.