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Determining Minimum Wages in China: Do Economic Factors Dominate?

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ABSTRACT

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Minimum wages may be an important instrument to reduce income inequality in a society and to promote socially inclusive economic growth. While higher minimum wages can support the Chinese transformation towards consumption driven growth, they can worsen the price competitiveness in export markets. As they differ throughout the country, this paper investigates their determinants at the regional level. In addition to a broad set of economic determinants, such as per capita income and consumption, consumer prices, unemployment and industrial structures, spatial effects are taken into account. They might arise for different reasons, including competition of local policymakers. The results show that the impact of economic variables declines, once spatial spillovers are considered. Although the minimum wage regulation pursues the relevance of economic factors in the determination of the appropriate levels, the actual development is largely driven by regional dependencies. As minimum wage standards set by local officials do not fully reflect the regional economic development, further reforms should be on the agenda.

JEL Classification: J30, R23, C23

Keywords: Chinese transformation, minimum wages, spatial effects, spatial Durbin model

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1 Introduction

The Chinese economic transformation stands at its crossroads. Previous policies contributed to the emergence of huge overcapacities in many industrial sectors. In contrast to the export- and investment-led growth strategy of the past, private consumption should play a more dominant role over the next years. At the same time, income inequality is striking. According to the National Bureau of Statistics, the ratio of per capita income between high (medium) and low income earners increased from 3.6 (1.9) to 4.9 (2.2) over the past decade. According to the same source the Gini coefficient is about 0.5, after 0.2 at the onset of economic reforms almost four decades ago. Income gaps can only partly be attributed to different labour skills. In particular, the urban-rural income divide is striking. Net earnings of private households in rural areas amount to one third of the urban level. Large inequalities can undermine the political stability of the country and lead to social unrest. Although the Chinese growth record was spectacular starting from the beginning of the reforms, significant parts of the population benefitted to a less extent.

Minimum wages may be an instrument to reduce income inequality and foster socially inclusive economic growth. They can provide a safety net, since they introduce a wage floor and guarantee a basic standard of living for workers and their families (Lin and Yun, 2014). During the recent years, the Chinese government implemented various policies to raise income levels at the lower end, such as the provision of social security for rural areas and the minimum wage policy[2]. Since standards of living differ across regions, China does not set one minimum wage for the whole country. Instead, the task of determining minimum wages is delegated to local authorities. Each province or municipality set its own minimum wage in accordance with the individual regional conditions. Higher minimum wages can underpin the transformation towards consumption-led growth, as low income households have a high marginal propensity to consume. At the same time, increasing costs can worsen the attractiveness of regions as potential destination for investment flows. This may constitute a conflict of interest, as officials from areas of strong GDP growth have better chances to be promoted. They are able to manage economic challenges to a higher extent and may have better career opportunities in the communist party. Therefore, local policymakers can have the incentive to keep minimum wages at relatively low levels in order to improve cost competitiveness. On the other hand, how-

[2] Due to the new rural pension and medical insurance schemes, the disparities in access to basic social services have narrowed, but the quality of the services remains to be inferior compared to entitlements in the urban areas.

ever, higher minimum wages can be also seen as an indication of a sound economic performance.

Several papers studied the impacts of minimum wages, most notably on the employment record. Ma, Zhang and Zhu (2012) argued that a rise in minimum wages of 10 percent will lead to an increase in the average wage of 0.5 percent and a decrease in employment of 0.6 percent in the export oriented manufacturing and labour intensive sectors. According to Wang and Gunderson (2011, 2012) minimum wages do not influence neither overall wages nor employment in Eastern Chinese regions. Adverse effects can be observed in industries more responsive to market pressures, in low-wage sectors such as retail and wholesale trade and in restaurants, as well as for women. Employment effects turn out to be positive for state-owned enterprises. Ni, Wang and Yao (2011) stressed the impact of the regional dimension for the results. While the employment effects from a minimum wage increase appear to be slightly negative in Eastern China, they are insignificant or slightly positive in the Central and Western areas. Fang and Lin (2013) found that a rise in the minimum wage has negative employment effects in Eastern and Central regions for groups with high labour market risk, such as the young adults, females and the low skilled. Labour demand elasticities range from -0.265 to -0.340. In the less developed areas of Western China, no significant effects are detected. The results are broadly confirmed by Jia (2014). While male employment is not influenced, female employment is expected to fall after a minimum wage increase. To better protect disadvantaged workers, future minimum wage reforms should focus on the most vulnerable workers, such as the less-educated women.

Mayneris, Poncet and Zhang (2014) investigated whether the recent minimum wage reform affected the survival and productivity of regional enterprises. In principle, stronger minimum wage growth allows more productive firms to replace the least productive ones and forces incumbent firms to raise their competitiveness. The study reported aggregate efficiency gains attributed to the reform. Huang, Loungani and Wang (2014) found that firms with higher wages or large profit margins increase employment, while those with low wages or small profit margins will downsize labour input. The net effect of higher minimum wages on employment turns out to be positive. Xing and Xu (2015) explored the regional variation of minimum wages. Despite the decentralization in the implementation of minimum wages, regional differences declined after the turn of the century. Economic determinants, such as GDP, the economic structure (share of tertiary industry) and the consumption level are the main drivers of the dispersion. In addition, there is weak evidence that the variation of minimum wages is influ-

enced by political factors. The latter finding is based on the actual timing of minimum wage decisions. Regions with stronger GDP, higher fiscal expenditures, and a larger services sector tend to adjust later than other regions. However, minimum wages are slightly higher than in the competitive areas.

Despite this literature, the analysis of the determinants of minimum wages is still at an infancy stage. To bridge the gap, this paper presents evidence on the relative role of the factors driving the evolution. Besides the potential economic determinants, such as per capita income and consumption, consumer prices, unemployment and specific industrial patterns, regional spillovers could be relevant, but they have not been examined so far. The exclusion of these dependencies might constitute an omitted variable bias in the regressions and can lead to misinterpretations of the results. As a consequence, policy conclusions based on the assumption of regional independence may be invalid. Cross section correlation patterns could arise because of common infrastructure facilities and migration flows, but can also stem from regional competition. To stay competitive in terms of costs, local authorities are reluctant to raise minimum wages above the level in neighbourhood regions, as they fear the loss of cost advantages. Note that a race to the bottom is not implied for the emergence of regional spillovers. Higher minimum wages can also signal prosperity and avoid labour shortages. Even skilled workers might be attracted, since a more generous minimum wage represents an advanced level of the development. In any case, minimum wages in competitive regions are a benchmark when determining the own wage level.

According to the spatial Durbin model employed in the analysis, both groups of factors contribute to explain the development of minimum wages. While they are closely connected to average wages and consumer prices, other regressors like per capita consumption or the unemployment rate are important only if they interact with the regional dimension. The impact of economic variables declines, once regional spillovers are added to the regression. Although the minimum wage decree stresses the relevance of economic factors for their proper determination, the actual evolution is characterized to a large extent by regional spillovers. Since minimum wages set by officials do not fully reflect the economic conditions, further reforms should be on the agenda.

The rest of the paper is structured as follows. Section 2 reviews the major steps of the minimum wage regulation in China. Section 3 presents the spatial econometric techniques used in the analysis. After discussing the main trends in the evolution of minimum wages, panel mod-

els are specified at the level of Chinese provinces in Section 4. While a standard fixed effects approach confirms the presence of economic factors in the process driving minimum wages, the panel spatial Durbin model reveals that some of the determinants are relevant only because of the geographical pattern. Finally, Section 5 concludes with some policy recommendations.

2 Minimum wage regulation in China

Due to low wage growth and an acceleration of inflation, several provinces like Guangdong and Shenzhen introduced minimum wages at a local scale in the late 1980s. Driven by increasing labour disputes, China implemented its first minimum wage regime in 1994, after ratification of the International Labour Organization Convention. Local governments are authorized to set their own minimum wages (Casale and Zhu 2013; Holz 2014). They are determined in line with regional economic factors, including the average living expenses and wages, social security contributions, unemployment rates and the level of development. In principle, firms covered by the reform include the state-owned and private enterprises, as long as they are engaged in economic activities. However, the rule was quite porous, as the local authorities could exempt township and village enterprises from the regulation. Furthermore, the penalties in case of non-enforcement were relatively moderate and amounted to 20-100 percent of the owed wage. As a consequence, official minimum wages were not very binding.

A stricter reform has been implemented in 2004. The new decree issued by the government introduced more comprehensive standards. Coverage is extended to town village enterprises (TVEs), self-employed businesses, private non-enterprise units and migrant workers. The penalties for violators increased to 100-500 percent of the owed wage. Besides the monthly wage, hourly minimum wages are introduced for part-time work. Firms cannot include overtime premia or canteen and traveling supplements as part of their wages when calculating minimum wages. Minimum-wages should be also adjusted more frequently, at least every two years. In the advance of the adjustment, the local authorities are required to submit a proposal to the central government. The proposal has to be in advance discussed with local trade unions and enterprise confederations. The Ministry of Labour provides recommendations that can lead to revisions of the initial plan. If there are no further requests, the regional authorities are entitled to adjust the minimum wage. The new regulation led to substantial wage growth, also stimulated by increasing labour unrest.

The aim of the minimum wage regulation is to raise standards of living at the low end of the income distribution. Local minimum wage for full-time workers should be about 40 to 60 percent of the average local wage which in line with international standards. Although minimum wages increased at double-digit rates during the last years, the target has not been met so far, owing to low initial values. According to Han, Wei and Wai-Kwong Mok (2011) workers in two thirds of the cities covered by their analysis received minimum wages below the poverty line in 2010. However, this share is only a rough indication, because it is likely upward biased. Average annual wages are usually based on labour surveys conducted in urban areas. Migrant workers and workers in informal sectors, who often earn less than the average wage are not fully represented in the sample. Thus, the actual average wage tends to be overestimated, implying that the relative minimum wage, i.e. the ratio between the minimum and the average wage will be underestimated. Nonetheless, as stressed in the 13th five-year-plan of the government, further increases of minimum wages are on the agenda, despite of the growth slowdown of the Chinese economy.

3 Econometric models for regional dependencies

Regional variables can be spatially autocorrelated for several reasons. For example, the spatial units can be hit by common shocks or share the same infrastructure. In addition, policy decisions in one area can be affected by corresponding decisions in neighbourhood regions, as it can be expected in the presence of regional competition. Local spillovers constitute a correlation pattern over the cross section and can blur the regression results (Anselin, 1988). The Moran coefficient

$$M = \boldsymbol{z}'\boldsymbol{W}\boldsymbol{z} / \boldsymbol{z}'\boldsymbol{z} \tag{1}$$

is an overall measure to detect the strength of spatial autocorrelation embedded in a variable *z*. The vector ***z*** holds the observations of *N* regions in terms of deviations from their mean. ***W*** is a spatial weight matrix with information on the regional pattern of the study area. Often the spatial weights are based on the contiguity structure of regions. In case of first order spatial autocorrelation, the weights are equal to 1, if two regions share a common border and 0 otherwise[3]. If the weights are row-standardized, the Moran coefficient is bounded between -1

[3] Spatial autocorrelation of higher order can be defined in a similar fashion, by noting the number of areas between the two regions considered. According to the fundamental geographical principle, nearer regions

and 1. While positive values indicate regional clustering, negative values point to regional dispersion. The standardized coefficient can be shown to be approximately distributed as standard normal (Anselin, 1988).

Regional spillovers can be captured by various specifications (Elhorst, 2009). The spatial autoregressive model

$$(2) \qquad y_{it} = c_i + \rho W y_{it} + \sum_{j=1}^{k} \beta_{jk} x_{jt} + u_{it}$$

includes a spatial lag. The latter is limited to the dependent variable *y* and extends the set of standard regressors included in *x*. Thus, while minimum wages might be correlated across provinces, their potential economic determinants are not. The index *i* denotes the region and *t* is time. In contrast, the spatial error model

$$(3) \qquad y_{it} = c_i + \sum_{i=1}^{k} \beta_{ik} x_{it} + u_{it} \quad , \quad u_{it} = \lambda W u_{it} + v_{it}$$

refers to spatial dependencies in the error process. While *u* is spatially autocorrelated, *v* is purely random. The spatial error can reflect the presence of other variables not explicitly included in the regression approach, such as common cultural habits, but can also occur due to spatial lags in the exogenous variables. In fact, note that the spatial error model may be written as a special case of the spatial Durbin model

$$(1-\lambda W) y_{it} = (1-\lambda W) c_i + (1-\lambda W) \sum_{i=1}^{k} \beta_j x_{jt} + v_{it}$$

$$(4) \qquad y_{it} = f_i + \lambda W y_{it} + \sum_{j=1}^{k} \beta_j x_{jt} + \sum_{j=1}^{k} \theta_j W x_{jt} + v_{it}$$

with

$$(5) \qquad \theta_j = -\lambda \beta_j \quad , \quad j = 1,..,k$$

that can control for spatial dependencies in presumably all variables. The model might be specified in a restricted or unrestricted version, depending on whether the *k* common factor restrictions in (5) hold or not. The appropriate inclusion of spatial effects is conditional on the

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are closer related to each other than more distant ones. Hence, spatial correlation of order 1 is the more relevant case.

evaluation of the Moran coefficient. The models are estimated by maximum likelihood techniques (Lee and Yu, 2010).

In a regional environment, a change of explanatory variables in a particular region can affect the endogenous variable not only in the same region, but also in geographical surroundings (LeSage and Pace, 2009). Therefore, direct and indirect effects could be distinguished. Direct effects refer to the own partial derivatives of the endogenous variable with respect to exogenous variables in the same region. Feedback loops initiated in other regions are included in the calculation. The indirect effects are obtained as cross-section partial derivatives and show the reaction of the endogeneous variable after a change of exogenous variables in other regions. Formally, direct and indirect effects are inferred from a Leontief expansion of the spatial multiplier matrix (Anselin, 2003). The total impact of a regressor is obtained as the sum of the direct and indirect components.

4 Explaining regional minimum wages

After the implementation of the reform in 2004, regional minimum wages increased substantially (Figure 1). While the annual rise was about 10 percent in many provinces before the global financial crisis, growth rates often doubled since then. Therefore, the acceleration of minimum wages is even more striking in later years. It should be noted that the most recent period is not covered by the literature discussed above, since the included observations usually do not go beyond 2009. For a fast transforming economy like China, this constitutes a serious drawback. In 2009, the central government advised the local authorities to postpone the adjustment of minimum wages, because of the widespread fears of employment losses in export oriented sectors due to the world economic recession.

-Figure 1 about here-

In 2014, minimum wages ranged from 830 Renmimbi (Guangxi) to 1820 (Shanghai) per month. The levels are not fully comparable, because some provinces such as Beijing and Shanghai do not subtract payments related to social security and housing funds when they determine their wage level. As a consequence, the calculated gap of 990 Renmimbi is likely exaggerated. There is also remarkable differentiation within the borders of a province, since the municipalities can

set their own wages. For example, the spread between the ceiling of the minimum wage and its floor is almost 20 percent of the average minimum wage in Hainan. The variation of minimum wages within a province is not adressed in this study, as the potential economic determinants are only reported for provinces. However, it should be noted that an analysis for the provincial level will likely downweight the role of regional spillovers. Spatial dependencies are likely weaker the larger the regional entities are.

Evidence in favour of minimum wage convergence is presented in Figure 2. The impact of the initial minimum wage level (2004) on further minimum wage growth (2004-2014) is negative. Provinces with initially higher (lower) wage levels show lower (higher) subsequent wage growth on average. The so-called beta convergence is accompanied by sigma convergence. The dispersion of regional minimum wages fell over time, but the trend is not uniformly visible over the years.

-Figure 2 about here-

Convergence is consistent with the existence of regional spillovers. Indeed, spatial effects are important for the evolution of minimum wages, but also for the development of potential economic determinants. Despite the fact that the provinces constitute relatively large territorial entities, spatial dependencies are a widespread phenomenon in the Chinese economy (Table 1).

-Table 1 about here-

The null hypothesis of no spatial autocorrelation can be rejected at the 0.01 level for minimum wages, GDP per capita, consumption per capita, the export share to proxy the industrial structure and the size of the private sector, measured in terms of employees. Results are mixed for the other variables. Regional CPIs exhibit a strong spatial autocorrelation pattern, with correlation coefficients above 0.3, except for the first years of the sample. Regional spillovers are much weaker for the unemployment rate and can be detected only in half of the periods at the 0.1 level. Average wages appear to be spatially autocorrelated, but only in the first years of the sample. Since 2008, the Moran coefficient becomes insignificant and turns even into the nega-

tive domain, although it does not become significant. Different results for minimum wages and wages might be related to the fact that minimum wages are set by local authorities who look at the evolution in the surroundings. Aggregated wages might reflect the individual economic conditions to a larger extent. Positive values of the Moran coefficient point to the formation of regional clusters, i.e. similar trends between regions in the geographical neighbourhood. The evidence for the existence of spatial autocorrelation appears to be rather homogeneous over time and is not linked to a particular period.

Because of the spatial autocorrelation pattern, the determinants of minimum wages have to be evaluated within the environment of a spatial panel model. Due to the fact that the regional spillovers are not restricted to minimum wages, a spatial Durbin approach is appropriate. To obtain a reference for the further discussion, an ordinary panel model with provincial fixed effects is estimated. As spatial lags are omitted, the equation is likely misspecified. However, the exercise can provide insights into the robustness of standard regression results. As a starting point, all potential determinants of the minimum wage listed in Table 1 are included. Then, redundant variables with significance levels above 0.1 are eliminated subsequently. The regression results can be seen from Table 2.

-Table 2 about here-

Since minimum wages are reported in terms of floors and ceilings per region, evidence is provided for both alternatives[4]. This can also serve as a test on the robustness of the results. Evidence is presented for cross-section fixed effects models. According to the Hausman test, random effects are strongly rejected for the ceiling variant (chi-square 26.52, *p*-value=0.000). The indication is less clear for the minimum wage floor model (chi-square = 5.92, *p*-value 0.116). Anyway, the random effects approach delivers very similar results. Minimum wages are strongly affected by consumer prices. The elasticity exceeds 2, i.e. the nominal minimum wage increases have triggered increases in real terms and raised the standard of living at the lower end of the income distribution. An acceleration in per capita consumption expenditures leads to a less than proportional acceleration of the minimum wage, with an elasticity of 0.4. Wages per employee exert a negative impact. Thus, the higher the wage level in a region, the lower its

[4] For Beijing, Shanghai and Tianjin, only average minimum wages are available. They are used in both model variants,

minimum wage. While this effect is significant for the floors, it diminishes for the minimum wage ceilings. The evidence implies that minimum wages are decoupled from the overall wage evolution to some extent. Similarly, previous studies have been unable to establish a clear-cut relationship between these variables, see Wang and Gunderson (2011, 2012). The missing positive link may be due to the inclusion of other regressors. Higher consumer prices will raise both minimum and the overall regional wages. An otherwise positive relationship could diminish once consumer prices enter the regression.

The findings of Table 2 should be taken with care, as they rely on the assumption of independent panel members. However, this condition is hardly fulfilled. Due to the findings of Table 1, the variables are autocorrelated over the cross section. Spatial lags may be important, both for the minimum wage as well as for the potential economic determinants. Table 3 displays the maximum likelihood results for the unrestricted spatial Durbin model. Similar to the strategy in the standard panel setting, an overparameterized model is a starting point. In further rounds of the estimation, insignificant variables (0.1 level) are eliminated subsequently. As the Hausman test strongly rejects random effects specification (chi-square= 30.46, *p*-value=0.000 for the minimum wage floor, chi-square=25.87, *p*-value=0.002 in case of minimum wage ceilings) cross section fixed effects models are reported.

-Table 3 about here-

The results reveal the high relevance of the spatial lag of the minimum wage. A coefficient in the range of 0.3-0.4 implies that minimum wages in one region are strongly affected by minimum wages in other regions. In fact, the development in the surroundings will exert a further upward pressure on the wage level. Obviously, local policymakers aim to provide an incentive to settle down in their region, in order to avoid shortages in unskilled labor. Further results are broadly in line with those from the standard panel approach, but offer deeper insights into the factors driving minimum wages. The unemployment rate enters the preferred specification, not per se, but only by means of its spatial lag. The higher the unemployment is in geographical neighbourhood, the lower the minimum wage level in a region. While the CPI is important on its own, consumption per capita exerts an impact only because of regional spillovers. The impact stemming from the overall wage evolution is still negative, at least in case of the floor model. The effect is based upon own and external ingredients, where the weight of each com-

ponent amounts to roughly 50 percent. Note that the total elasticities exhibited in Table3 are quite similar to the coefficients obtained in the standard panel model.

5 Conclusions

As they define a lower bound, minimum wages are an important instrument to reduce income inequality in a society and to promote socially inclusive economic growth. While higher minimum wages can support the Chinese transformation towards consumption driven growth, they can worsen the price competitiveness in export markets. As they differ throughout the country, this paper investigates their determinants at the regional level. In addition to a broad set of economic indicators, such as per capita income and consumption, CPI, unemployment and industrial structures, spatial effects are taken into account. They might arise for different reasons, including competition of local policymakers. The results show that the impact of economic variables declines, once spatial spillovers are considered. Although the minimum wage regulation pursues the relevance of economic factors in the determination of the appropriate levels, the actual development is largely driven by regional dependencies. As minimum wage standards set by local officials do not fully reflect the regional economic development, further reforms should be on the agenda.

The impact analysis can provide better insights on the strength of the own region's effect and spatial spillovers. In particular, it becomes obvious that regular wages of employees in neighbourhood regions do not exert a significant influence on minimum wages. Differences are due to the fact that the regression coefficient of the spillover variable also capture feedback influences passing through neighbours and back to the own region. Furthermore, spillover effects of consumption and unemployment tend to be stronger than indicated by the regression coefficients.

References

Anselin L (1988): Spatial econometrics: methods and models. Dordrecht, Kluwer Academic Publishers.

Anselin L (2003): Spatial externalities, spatial multipliers, and spatial econometrics, International Regional Science Review 26, 153-166.

Casale G, Zhu C (2013): Labour administration reforms in China, International Labour Office, Geneva.

Elhorst JP (2009): Spatial panel data models, in Fischer MM, Getis A (eds): Handbook of Applied Spatial Analysis, 377-407.

Fang T, Lin C (2013): Minimum wages and employment in China, IZA Discussion Paper 7813.

Han Z, Wei Z, Wai-Kwong Mok V (2011): Empirical study on minimum wage level in China. The ELES approach, Journal of Contemporary China 20, 639-657.

Holz C (2014): Wage determination in China during the reform period, BOFIT Discussion Paper 13/2014.

Huang Y, Loungani P, Wang G (2014): Minimum wage and firm employment: Evidence from China, Federal Reserve Bank of Dallas Globalization and Monetary Policy Institute Working Paper 173.

Jia P (2014): Employment and working hour effects of minimum wage increase: Evidence from China, China and the World Economy 22, 61-80.

Lee LF, Yu J (2010): Estimation of spatial autoregressive panel data models with fixed effects, Journal of Econometrics 154, 165–185.

Lin C, Yun M-S (2014): Minimum wages and income inequality in urban China, Korea Labor Institute, Working Paper.

Ma S, Zhang J, Zhu X (2012): The effect of the minimum wage on average wage and employment: Evidence from firms in Chinese manufacturing industry, Economic Research Journal 5, 132-146.

Mayneris F, Poncet S, Zhang T (2014): The cleansing effect the of minimum wage: Minimum wage rules, firm dynamics and aggregate productivity in China, CEPII Working Paper 2014-16, Paris.

Ni J, Wang G, Yao X (2011): Impact of minimum wages on employment, The Chinese Economy 44, 18-38.

LeSage J P, Pace RK (2009): Introduction to spatial econometrics, Taylor & Francis.

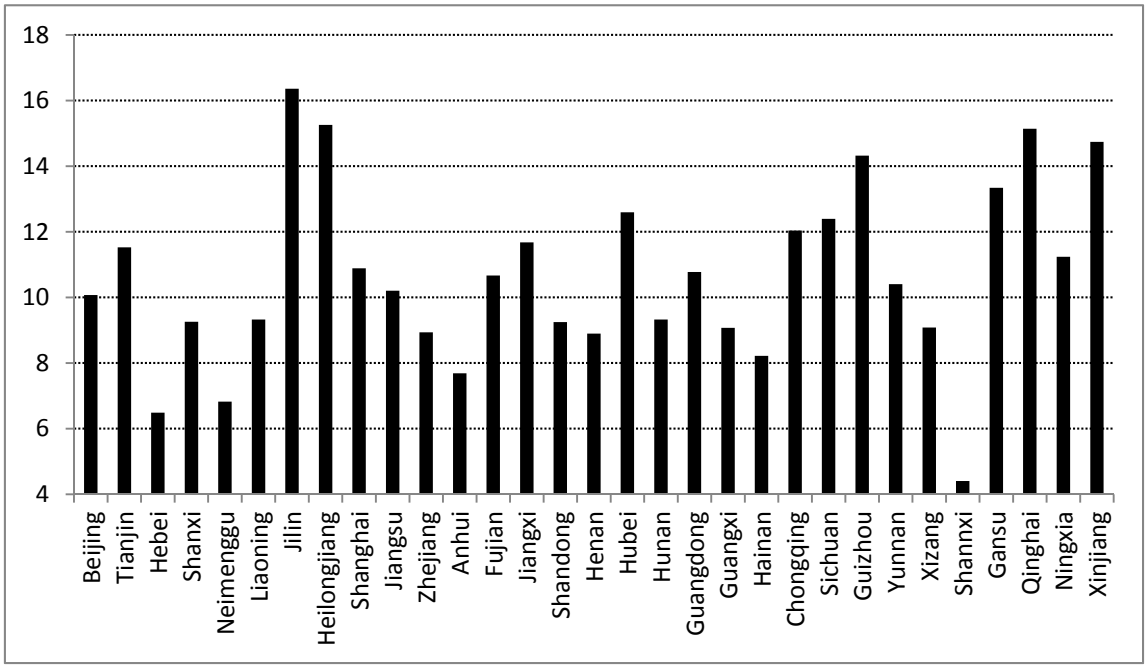
Wang J, Gunderson M (2011): Minimum wage impacts in China: Estimates from a prespecified research design, 2000-2007, Contemporary Economic Policy 29, 392-406.

Wang J, Gunderson M (2012): Minimum wage effects on employment and wages: Dif-in-Dif estimates from Eastern China, International Journal of Manpower 33, 860-876.

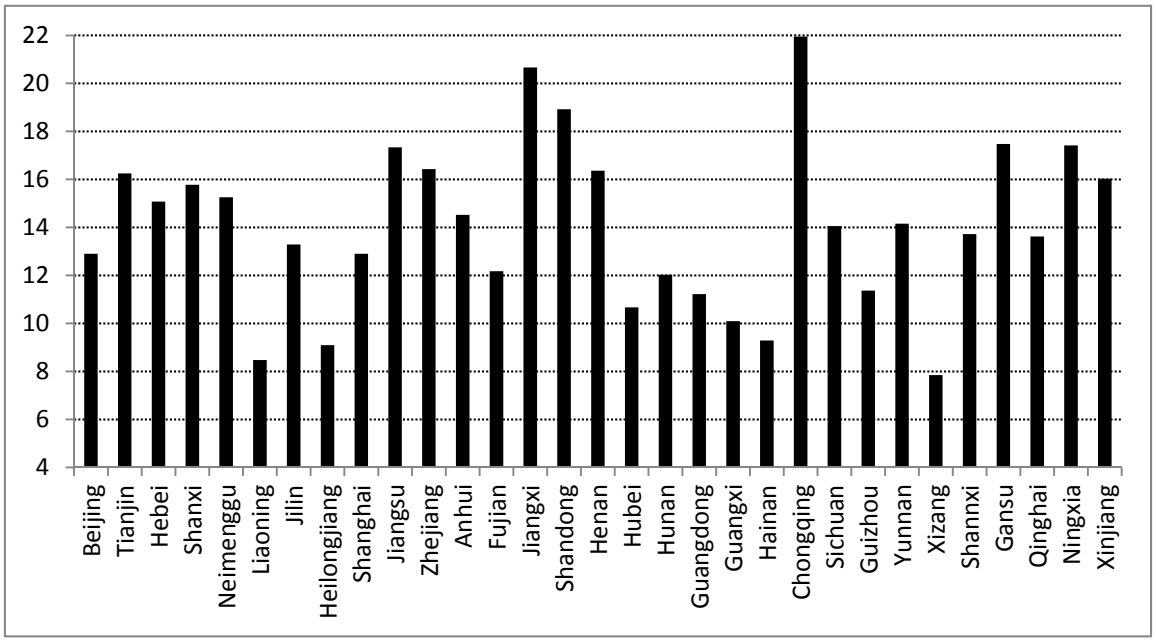
Xing C, Xu J (2015): Regional variation of the minimum wages in China, IZA Discussion Paper 8931.

Figure 1: Annual minimum wage growth per province

2004-2008



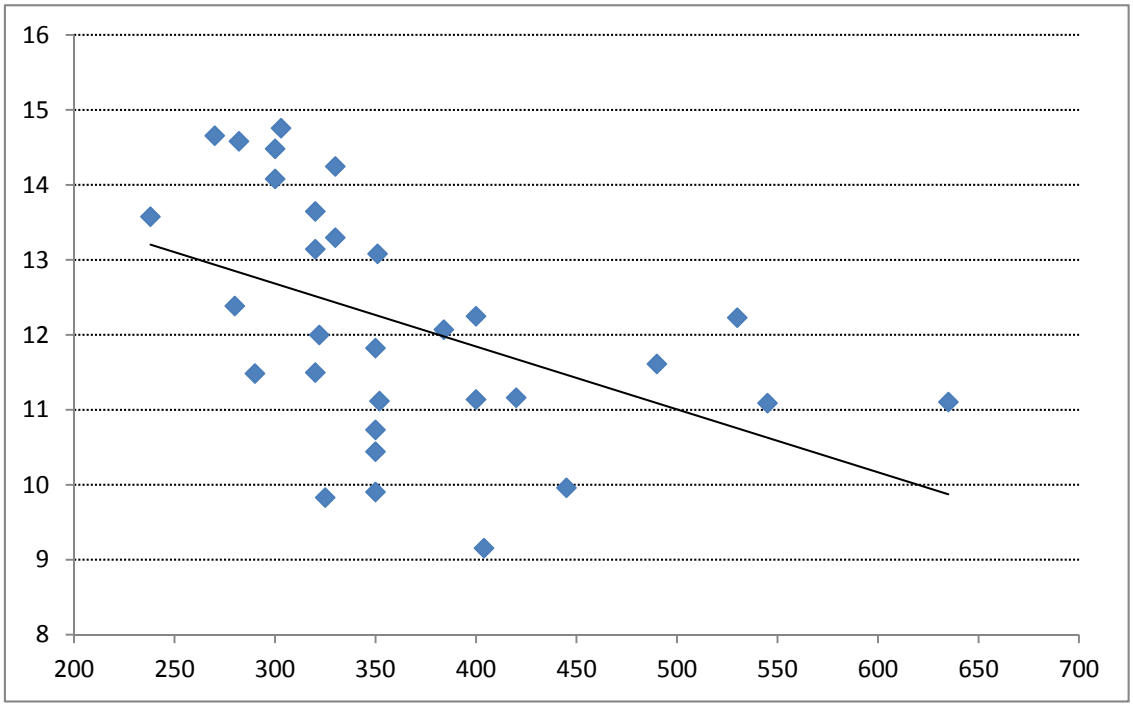
2010-2014



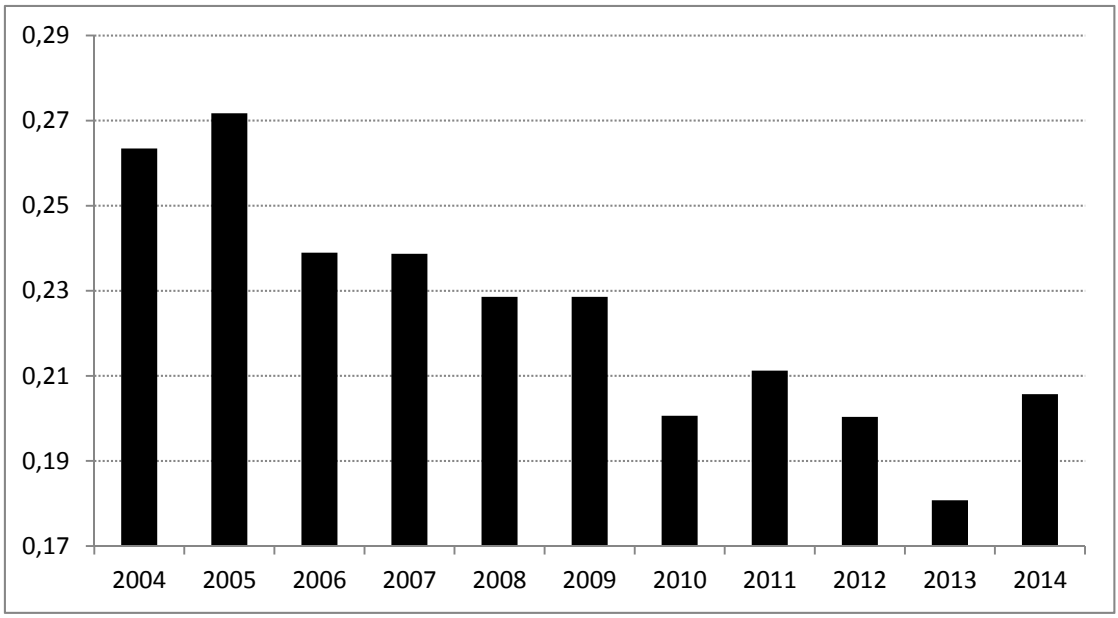
Note: Chinese National Bureau of Statistics. Annual data for 31 provinces over the 2004-14 period. Nominal minimum wages per month are available both in terms of floors and ceilings per region. The evidence refers to the floors, but it is quite similar for the ceilings. For Beijing, Shanghai and Tianjin, only averages are reported.

Figure 2: Convergence of minimum wages

Beta convergence



Sigma convergence



Note: See Figure 1. Upper part: Regression of minimim wage growth over the 2004-14 period on the minimum wage level in 2004 (horizontal axis). Lower part: Coefficient of variation of regional minimum wages.

Table 1: Moran coefficient for selected variables

	Minimum wage	Wage per employee	GDP per capita	Unemployment rate
2004	0.363 (0.000)	0.335 (0.001)	0.501 (0.000)	0.136 (0.058)
2005	0.382 (0.000)	0.253 (0.008)	0.473 (0.000)	0.112 (0.103)
2006	0.370 (0.000)	0.233 (0.013)	0.467 (0.000)	0.147 (0.056)
2007	0.327 (0.001)	0.135 (0.081)	0.458 (0.000)	0.068 (0.183)
2008	0.336 (0.001)	0.093 (0.144)	0.437 (0.000)	0.018 (0.321)
2009	0.336 (0.001)	-0.007 (0.413)	0.441 (0.000)	0.046 (0.223)
2010	0.335 (0.001)	-0.057 (0.421)	0.439 (0.000)	0.062 (0.188)
2011	0.220 (0.015)	-0.080 (0.348)	0.434 (0.000)	0.107 (0.106)
2012	0.355 (0.000)	-0.115 (0.247)	0.416 (0.000)	-0.007 (0.409)
2013	0.325 (0.001)	-0.108 (0.264)	0.397 (0.000)	-0.064 (0.396)
2014	0.350 (0.001)	-0.143 (0.174)	0.374 (0.000)	-0.061 (0.407)

	CPI	Consumption per capita	Export to GDP	Private sector
2004	0.032 (0.293)	0.372 (0.000)	0.268 (0.004)	0.325 (0.001)
2005	0.020 (0.328)	0.354 (0.000)	0.306 (0.002)	0.375 (0.000)
2006	0.033 (0.288)	0.385 (0.000)	0.316 (0.001)	0.415 (0.000)
2007	0.299 (0.003)	0.376 (0.000)	0.308 (0.001)	0.393 (0.000)
2008	0.290 (0.003)	0.367 (0.000)	0.321 (0.001)	0.388 (0.000)
2009	0.358 (0.000)	0.366 (0.000)	0.351 (0.000)	0.387 (0.000)
2010	0.362 (0.000)	0.367 (0.000)	0.378 (0.000)	0.415 (0.000)
2011	0.374 (0.000)	0.372 (0.000)	0.373 (0.000)	0.447 (0.000)
2012	0.407 (0.000)	0.340 (0.001)	0.306 (0.001)	0.477 (0.000)
2013	0.409 (0.000)	0.344 (0.001)	0.291 (0.002)	0.499 (0.000)
2014	0.421 (0.000)	0.318 (0.001)	0.321 (0.001)	0.538 (0.000)

Note: See Figure 1. Number in parentheses are *p*-values. Variables in nominal terms. Size of the private sector is the ratio of workers employed in the private sector to total employees. Minimum wages and wages, GDP, CPI and consumption are in logs.

Table 2: Fixed-effects panel models for the minimum wage

	Minimum wage floor	Minimum wage ceiling
Wage per employee	-0.184 (0.038)	-0.087 (0.035)
CPI	2.667 (0.273)	2.176 (0.255)
Consumption per capita	0.434 (0.066)	0.419 (0.062)

Floor: R^2=0.851 SER=0.095 Log likelihood=331.33
Ceiling: R^2=0.860 SER=0.090 Log likelihood=354.80

Note: Chinese National Bureau of Statistics. 31 provinces, Sample period 2004-2014. Standard errors in parentheses. Minimum wages, wages per employee and consumption per capita in logs. R^2 the coefficient of determination, SER is the standard error of regression, Log likelihood denotes the maximum of the likelihood function for the fixed effects variant.

Table 3: Spatial Durbin model for the minimum wage

	Minimum wage floors	Minimum wage ceilings
Wage per employee	-0.086 (0.038)	-0.019 (0.033)
CPI	1.009 (0.376)	0.706 (0.330)
Consumption per capita	0.041 (0.071)	0.031 (0.062)
Unemployment rate	0.025 (0.017)	0.015 (0.015)
Spatial lags		
Minimum wage	0.334 (0.061)	0.444 (0.054)
Wage per employee	-0.047 (0.047)	-0.011 (0.040)
CPI	0.307 (0.513)	0.074 (0.452)
Consumption per capita	0.307 (0.104)	0.224 (0.091)
Unemployment rate	-0.149 (0.042)	-0.145 (0.038)

Minimum wage floor

	Direct effects	Indirect effects	Total effects
Wage per employee	-0.093 (0.031)	-0.097 (0.051)	-0.190 (0.056)
CPI	1.089 (0.368)	0.888 (0.674)	1.977 (0.525)
Consumption per capita	0.069 (0.066)	0.448 (0.144)	0.518 (0.138)
Unemployment rate	0.014 (0.021)	-0.190 (0.066)	-0.176 (0.078)

Pseudo R^2=0.830 SER=0.078 Log likelihood=379.54

Minimum wage ceilings

	Direct effects	Indirect effects	Total effects
Wage per employee	-0.021 (0.028)	-0.020 (0.054)	-0.040 (0.061)
CPI	0.775 (0.319)	0.623 (0.662)	1.398 (0.559)
Consumption per capita	0.062 (0.058)	0.392 (0.146)	0.453 (0.146)
Unemployment rate	-0.001 (0.020)	-0.222 (0.070)	-0.224 (0.146)

Pseudo R^2=0.865 SER=0.069 Log likelihood=418.08

Note: Chinese National Bureau of Statistics. 31 provinces, Sample period 2004-2014. Standard errors in parentheses. Minimum wages, wages per employee and consumption per capita in logs. R2 the coefficient of determination, SER is the standard error of regression, Log likelihood denotes the maximum of the likelihood function.