Consumption Response to Minimum Wages: Evidence from Chinese Households

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Abstract

The paper evaluates the impact of the Chinese minimum wage policy on consumption of low income household for the period 2002-2009. Using a representative household panel, we find that the consumption response to minimum wage hike is increasing in the minimum wage share of household income. In particular, we find that poorer households fully consume their additional income. The large consumption effect is driven by households with at least one child, while childless poor households save two thirds of a minimum wage hike. The expenditure increase is concentrated in health care and education with potentially long-lasting benefits to household welfare.

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1 Introduction

In China, a minimum wage policy was firstly introduced in 1994 and today applies to a labor force of close to 800 million individuals.[1] By 2012, approximately 18% of urban households have at least one household member with a wage near the minimum wage. Extrapolated to the overall Chinese household population, this proportion means that an estimated 82.5 million households are affected by minimum wage legislation comprising approximately 265 million household members.[2] In this paper we seek to understand how effective China's minimum wage policy is in improving income and consumption of low income households.

Minimum wage policies are controversial also in emerging countries for fears about unemployment effects, threats to industrial competitiveness, and employment substitution into the informal labour market Rama (2001), Comola and De Mello (2011), Fang and Lin (2015). And there are additional concerns why higher minimum wages may fail to translate into higher levels of consumption: first, higher minimum wages may simply substitute for other social transfers so that the effective income increase is considerably attenuated. Many social transfer programs are conditioned by income thresholds and their cumulative effect of ineligibility is hard to evaluate in practice. Second, the disposable income effect of higher minimum wages may be perceived as transitory - particularly in emerging countries with higher price inflation. Consumption smoothing may then result only in a modest consumption increase. Third, higher minimum wages may increase unemployment risk, inducing demand for precautionary saving and again attenuating the consumption effect. Finally, a higher frequency of unemployment can make some households much worse off than in the previous policy regime.[3]

The analysis in this paper focuses on the effects of minimum wage policy on consumption spending in a representative panel of urban Chinese households for the period 2002-2009.[4] Our focus is on household consumption since it provides a particularly relevant metric of welfare and is often better measured and less volatile than income, Deaton (1997), Deaton and Grosh (2000). Moreover, in the development economics literature consumption is the standard measures to assess the relative poverty of households: the World Bank relies on consumption measures to construct the international extreme poverty line, Ravallion et al. (2009).

China provides a particularly rich institutional setting for research on the consumption effect of

[1] Source: International Labour Organization, ILOSTAT database, using World Bank population estimates. Labor data retrieved in March 2017 https://data.worldbank.org/indicator/SL.TLF.TOTL.IN?locations=CN

[2] See for instance the National Bureau of Statistics NBS (2013). China Statistical Yearbook 2013. Beijing: China Statistics Press. Available at: http://www.stats.gov.cn/tjsj/ndsj/2013/indexeh.htm

[3] For the effects of minimum wages on employment in the U.S. see for example the contributions of Krueger and Card (1995) and Card and Krueger (2000) juxtaposed to Neumark and Wascher (1992) and the recent evidence of Dube et al. (2010), Allegretto et al. (2011), Neumark et al. (2014a), Neumark et al. (2014b), Allegretto et al. (2016).

[4] We do not address issues of labor supply under minimum wage changes as hours worked are not comprehensively reported in the survey data.

minimum wages. The minimum wage level is set at the county level and is frequently reset in order to keep pace with price developments and standards of living in a high growth environment. For the period 2002-2009, we identify more than 13,874 changes of county-level minimum wage across China's 2,183 counties and 285 cities and match them to the urban household survey (UHS) which covers 73,164 urban household-year observations. No other labour market in the world can rival China's in the frequency, heterogeneity, and magnitude of local minimum wage changes. In this study we use the Chinese urban household survey which provides a detailed breakdown of both income and consumption along several categories. Importantly, we observe directly the amount of income transfers to household stemming from other social policies. This allows us to disentangle the confounding effect of other transfer policies from the impact of the minimum wage policy.

To the best of our knowledge, this paper is the first to estimate the consumption and income response of Chinese households to the large cross-sectional and intertemporal variation of China's minimum wages. The scale of the policy in the world's largest labor market add to the pertinence of the analysis. A few studies have investigated the impact of minimum wages on durable and non-durable consumption for U.S. states. Aaronson et al. (2012) estimate a positive expenditure effect for minimum wage dependent U.S. households, and conclude that most of the consumption is due to vehicle purchases. Similarly, Alonso (2016) employs sales data to find that a 10% increase in minimum wages increases non-durable consumption by 1% at an aggregate county level, and shows that the increase is greater in poorer counties.

Research on developing countries has examined the role of the minimum wage on the wage distribution and labor income inequality without documenting its effect on consumption. For instance, using labor survey data from Indonesia, Rama (2001) estimates the impact of doubling the minimum wage on the entire wage distribution, and finds that wages above the minimum wage also increased between 5-15%. Bosch and Manacorda (2010) find that growth inequality of income earnings in Mexico is due to the decline in the real value of the minimum wage. Engbom and Moser (2016) study the impact of the minimum wage change in Brazil on the reduction of earnings inequality and conclude that minimum wages help reduce earnings inequality in formal sectors of the economy and the decline is more pronounced at the bottom of the wage distribution.

Previous work on low income households in developing countries has considered alternative income shocks to estimate elasticities of consumption. Wolpin (1982) uses weather induced income shocks in India to estimate an income elasticity of consumption in the range 0.91-1.02 depending on the definition of consumption. Related work by Paxson (1992) studies weather shocks in Thailand to estimate the saving propensity to income shocks related to weather conditions; the estimated saving

propensity to positive and non-transitory weather induced income shocks is found to be greater than zero, but small. However, the persistence of disaster related income shocks is not always easy to assess and might be conditioned by other policies of disaster relief.

In this study we link the minimum wage literature to research on income shocks in developing countries by estimating the impact of minimum wages on consumption. We find that minimum wage increases in China are a very effective tool for increasing the consumption level of low income households. The estimated consumption elasticities imply that low income households spend the entire additional income coming from a higher minimum wage. We perform both reduced form estimations, which relate consumption changes directly to the increase in the annual minimum wage, as well as two-stage least square estimations (2SLS), which use the minimum wage increase as an instrument for household income in the consumption function. Both methods provide consistent results. In addition, the minimum wage elasticity of consumption does not differ significantly when we consider liquidity constrained households hinting that the effect is not confounded by liquidity constrained households. A surprisingly large share of more than 40% of the incremental income is devoted to health and educational expenditure, which is likely to improve the long-run income of the family. Only for the 6.5% of households without a child do we find a large saving rate. They save two thirds of the minimum wage related income increase.

The paper is organized as follows. Section 2 explains China's minimum wage regulation, the persistence in the behavior of real minimum wages, and the urban household survey. Section 3 discusses the research design. Section 4 presents the main results on the impact of the minimum wage level on total household consumption. Here we also highlight the important role of minimum wages in determining a household's health and education expenditure. The role of household heterogeneity for consumption behavior is discussed in Section 5 with a focus on financial constraints and household structure. In Section 6, we run a placebo test, and Section 7 concludes.

2 Institutional Framework and Data

2.1 China's Urban Household Survey

China's Urban Households Survey (UHS) represents a comprehensive and representative survey of urban workers and households managed by the Chinese National Bureau of Statistics (NBS). The UHS is conducted via stratified randomization sampling, records a wide range of demographic and socioeconomic conditions of Chinese urban households, including detailed information on different income sources, wages and granular consumption items for households. We then merge the urban

household survey with the minimum wage data. In this paper, we restrict the analysis to eight consecutive years of the UHS from 2002 to 2009. Prior to 2002, the survey does not provide a panel structure and we exclude the earlier years from the econometric analysis. Appendix B provides a detailed description of the merged sample and the data filters applied.

To analyze the impact of minimum wages on household consumption, we divide households in terms of their reliance on wage income near the local minimum wage. Let the variable S denote the share of total non-property income earned by the two best-paid household members due to a wage near the minimum wage.[5] Labor income of any household member is considered to be near the local minimum wage and counted towards the nominator of S if it falls within the range 50%-150% of the county minimum wage. We calculate the share S for the first year a household enters the survey to limit any endogeneity due to self-selection or composition effects.[6] To maintain the panel structure we include in the sample households that have been surveyed for at least two years and that have at least two household members observed in each survey. Formally, let $E_{m,h,c}$ denote the annual labor income and $w_{m,h,c}$ the wage of the two best paid household members $m = 1, 2$ in household h in county c. For a dummy variable $D[.] = 1$ indicating a wage in the range 50%-150% of county minimum wage MW_c, we define minimum wage income share as

$$S_{h,c} = \frac{1}{Total\ Income_{h,c}} \sum_{m=1,2} E_{m,h,c} \times D\left[0.5MW_c \leq w_{m,h,c} \leq 1.5MW_c\right] \tag{1}$$

where $Total\ Income_{h,c}$ in the denominator represents the sum of the total disposable income of the two top earners in the household.[7] By definition, the minimum wage income share S_{hc} is between 0 and 1; a higher share implies that the household tends to be poorer and her income more subject to any variation in the minimum wage policy. In the case where both the household head and spouse work at the minimum wage, the share S approaches one.[8] Throughout the analysis, we consider households without any minimum wage income ($S = 0$), the complementary set of households with at least some income related to the minimum wage ($S > 0$), households with at least half of their income

[5] Aaronson et al. (2012) use a similar definition for the minimum wage workers.

[6] The upper bound of 150% is consistent with the findings of spillover/ripple effects of minimum wages on the wage distribution whereby workers earning just above the minimum wage tend to have an upgrade when the minimum wage is increased, Krueger and Card (1995). The lower bound of 50% is applied to reduce measurement errors and to include workers in firms that do not comply fully with the minimum wage policy. The results are robust to other thresholds for minimum wage ripple effect (we experimented with 0.5-1.2 and 0.5-1.3) and they are robust to other definitions of the treatment, that is whether or not we assign the treatment in the first year an *individual* is sampled or, alternatively, when we allow for assignment to treatment only if the worker earns a minimum wage in every year she is observed.

[7] Disposable income is composed by the sum of labor income, property income, operating income and transfer income. We observe all of these sub-categories of income in the household survey.

[8] If all members of the household are unemployed in the first year the household enters the panel, the sum of the "best" two earners results in a zero labor income and consequently $S = 0$. We eliminate these households from the data set (i.e. only 166 observations or 0.2% of the overall sample) to avoid any confounding effects with households earning labor income above the minimum wage.

from wages near the minimum wage ($S > 0.5$), and households very dependent on the minimum wage for their subsistence ($S > 0.75$). The last two groups are the main focus of interest and we can expect the consumption response to minimum wage changes to be most pronounced for this group.

It is instructive to compare household characteristics across the four different household groups ($S = 0$, $S > 0$, $S > 0.5$ and $S > 0.75$) that increase their dependence on minimum wage income as the share S increases. Table A-IV in Appendix B reports the differences in the structure of household income and spending, Table A-V illustrates the differences in demographic structure.

Households with $S > 0.5$ ($S > 0.75$) account for 6% (5%) of all observations, but earn only 2.6% (2.4%) of all labor income, whereas households without minimum wage income represent 72% of the sample and earn 81.9% of all labor income. An advantage of the urban household survey data is that it records also transfer income and sub-components of transfer income such as social assistance income, unemployment benefit, dismissal compensation, indemnity insurance income etc. In the sample, and as expected, poorer households (with $S > 0.5$ or $S > 0.75$) feature a lower share of disposable income earned from labor income and rely more on social transfer income from the authorities; almost 20% of their disposable income comes from social transfers. Moreover, minimum wage dependent households tend to consume a higher proportion of their disposable income (82%) compared to households with $S = 0$ (70%).[9]

In terms of demographic characteristics, minimum wage households tend to be only slightly larger with 3.3 members compared to 3.1 for the household $S = 0$. This suggests that the one child policy was implemented consistently across income groups. Unsurprisingly, minimum wage household show lower house ownership rates and their migration to the urban area is typically more recent. We also highlight that minimum wage dependent households are much less likely to work for state-owned enterprise (SOE), in fact these tend to pay higher wages than the private sector. Finally, the educational level and work experience of the head of household tends to be lower for minimum wage dependent families.

2.2 Minimum Wage Regulation

Minimum wage changes in China originate in an administrative and political process that is not subject to an open public debate. The law only stipulates the requirement of regular review of the minimum wage level, not a mandatory change or wage level. When the decision of a higher nominal minimum wage is taken upon proposal by the local government and approval by the provincial authorities, implementation follows swiftly with a delay of only two months after a local government announcement.

[9] In Table A-IV and throughout the analysis, consumption is defined as expenditure on: food, clothes, household services, medical care, education, transportation and living. This is consumption *net of* purchasing property, transfer expenditures, social contributions and personal social expenditure. It is also *net of* investments, the latter can be confounded with savings.

Following the announcement, the information is spread via local government websites, local radio and TV channels. This decision process implies that little public information is generated that would allow households to anticipate well in advance minimum wage changes and modify their consumption behavior accordingly, Du and Jia (2016).

Chinese minimum wage legislation was first promulgated in 1994 following a wave of economic liberalization policies and the transition from predominantly state-owned production to a mixed economy with a growing private sector. However, the first implementation was ineffective since it lacked provisions and rules for the adjustment to price inflation and local economic conditions. It also suffered from lax enforcement and extensive non-compliance. Rawski (2003), Du and Wang (2008), Sun and Shu (2011), Ye et al. (2015).

The access of China to the World Trade Organization and the related boom of the manufacturing sector added pressure for a more efficient minimum wage regulation. In December 2003, the central government opted for a reform of minimum wage regulation, and in March 2004, the Ministry of Labor and Social Security introduced the new Minimum Wage Regulations (MWR) into Chinese Labor Law. The most significant provisions required indexation of the minimum wage to the cost of living and a minimum wage level sufficient to support basic daily needs of employees. Local authorities were required to review the minimum wage at least every two year in light of local economic conditions and propose a revised minimum wage to the provincial authorities. Moreover, implementation of the new MWR was strengthened by increased control at the local administrative level and firm level in pursuit of better compliance. Penalties for non-compliance increased from 20-100% of the statutory minimum wage to 100-500%.

Figure I illustrates the proportion of counties that increase their nominal annual minimum wage between 1996 and 2012. In line with the reformation of the MWR, trade liberalization and the large productivity growth of the booming manufacturing sector, real minimum wage growth in China was higher after the reform. Real minimum wage grew at 8.7% in the period 1996-2003 and accelerated to 12.8% in the period 2004-2012. In monetary terms, the average annual real minimum wage was only RMB 1,259 ($441 under PPP) in 1996, but had increased to RMB 4,610 ($1,309 under PPP) in 2012.[10] In the same period, the annual real growth rate of Chinese labor productivity was 8.9%, while real GDP oscillated around 9.7%.[11] In other terms, China's average real minimum wage started slightly above the international poverty line set at $1 per day in 1996, and increased to a remarkable

[10] Effective annual *nominal* minimum wage increased from RMB 2,628 ($921 under PPP) in 1996 to RMB 13,224 ($3,756 under PPP) in 2012.

[11] Purchasing power parity conversion factors are from the World Bank's International Comparison Program Database, data on growth are from the World Bank World Development Indicators, productivity data are from the OECD.stat Productivity Archives, see http://stats.oecd.org/Index.aspx?DataSetCode=PDB_LV.

$3.55 per day in two decades. In the following section we try to estimate the household use of this increase.

2.3 Minimum Wage Data

The data used in this study are collected by Chinese Ministry of Human Resources and report the hourly local minimum wage in 2,183 *counties* and 285 *cities* for the period 1994-2012.[12] We aggregate hourly wages to a yearly wage to match the annual reporting of the household survey data.[13] For consistency with our inferred annual wage, we discard from the sample all part-time workers since they may enjoy an annual labor income close to a minimum wage earner in spite of a higher hourly remuneration. The retained full-time workers are subject to heterogeneous minimum wage changes: those working in counties with a minimum wage hike constitute the treatment group and those working in counties with no change in minimum wage policy the control group in a given year.[14]

The urban consumption and income survey reports income from bonuses and overtime working hours, which we include as control variables in any specifications. In other words, a worker's recorded labor income is not affected by working extra hours which are classified as income arising from bonuses. We exploit this data feature, and assume a 40 hours working week for each full-time worker as stipulated in Chapter 4, Article 33, of the Chinese Labor Law.[15]

To check whether the assumption of a 40 hour work week (or 160 hours per month) is innocuous for our inference, we compare the reported monthly labor supply of full-time workers (available for a subset of workers in the period 2002-2006) with and without a minimum wage hike and report them in Table I for the period 2002 until 2009. This period represents the overlap between the minimum wage and urban household income and consumption data. The reported average monthly working hours tend to be slightly above 160 work hours the sample of full-time workers in non-minimum wage households ($S = 0$). The average monthly working hours are similar for individuals living in households that have at least one minimum wage worker ($S > 0$) as shown in Panel B of Table I. Moreover, there is no statistically significant difference between counties with and without minimum wage hikes. Only for the year 2002 do we find a weak statistical difference of minimum wage workers

[12]The province is the highest administrative division in China, followed by cities and counties. There are 34 provinces in the Chinese administrative subdivision as of April 2015, 333 prefecture-level cities and a total of 2,862 county-level divisions in China.

[13]This is consistent with the provision of the Chinese Labor law establishing under Article 36 that "The State shall practise a working hour system wherein labourers shall work for no more than eight hours a day and no more than 44 hours a week on the average".

[14]For their uncertain treatment and control group status, and as described in Appendix B, we also ignore self-employed individuals; retired household members; retired and then re-employed household members, incapacitated persons, home-workers, soldiers, social volunteers, students and other household members undergoing training.

[15]Details on Chinese Labor Law can be consulted at: http://www.china.org.cn/living_in_china/abc/2009-07/15/content_18140508.htm

labor supply between treated and non-treated counties.

Panel C of Table I reports the evolution of the minimum wage bite (i.e., the ratio of the Chinese minimum wage relative to county median income) in our sample. Chinese minimum wages are generally set at a very low level relative to the median wage. The average ratio of the minimum wage relative to the median wage fluctuates around 20% in the period 2002-2006 and then declines to 17.6% in 2009. In China, Minimum wage bites never approach the much higher levels observed in some developed countries, where the minimum wage bite ranges from around 30% in the U.S. to 60% in France and Sweden, Dickens (2015). Therefore, the labor income conditions of minimum wage workers in China are much worse in relative terms compared to minimum wage workers in high income economies. In absolute terms, the Chinese minimum wage income of a single worker is close to the international poverty line: it follows that any policy measure that increases the consumption level of these extremely poor households represents a reduction in poverty.

For the benefit of our inference, minimum wages in China were subject to large and heterogeneous local variation. Our empirical analysis focuses on the years 2002-2009 for which the urban household data is available as a stratified panel and can be matched with county-level minimum wage data. During this period, 79.5% of all county-year events increased their minimum wage in a given year, which translates into a total of 13,874 minimum wage increases. Figure I presents a diagram with the annual *share* of counties and cities that change the *nominal* minimum wage in the range of 0-10% or 10-20% or more than 20%. During the period almost one quarter of China's 2,183 counties (and 285 cities) in the sample raised the nominal minimum wage by more than 20%.[16]

2.4 Persistence and Predictability of the Minimum Wage Hike

Another issue concerns the intertemporal persistence of *real* minimum wage changes. Even if nominal minimum wage change are not likely to be reversed, price inflation can induce the mean reversion of the real minimum wage. If, on the other hand, *real* minimum wages feature a high degree of persistence, then the increase can be perceived as more persistent by the households. To explore the intertemporal persistence of real minimum wage increases, we run the regression

$$\Delta MW_{c,t} = \alpha_0 + \rho MW_{c,t-1} + a_1 t + \delta_{p,t} + \gamma_c + \varepsilon_{c,t}, \tag{2}$$

[16]While none of the counties featured a decrease in the nominal wage, local inflation combined with a constant minimum wage can decrease the *real* wage if the nominal wage stays constant. From 2002 to 2009, an average of 20.5% (3590) county-year events show a constant nominal minimum wage — implying a worsening of purchasing power of minimum wage workers. Yet, most local authorities appear attentive to the erosion of the minimum wage by inflation and tend to adjust the minimum wage by more than the rise in consumer prices: of the 13,874 county-year events with a minimum wage increase, only 1,235 had minimum wage increases below the inflation rate in the county. In real terms, approximately half of county-year increases implied a *real* minimum wage change in the range 0-10%, one-third of minimum wage increases was in the range 10-20%, and only a tenth above 20%.

where a coefficient $\rho < 0$ captures mean reversion to a time trend t of the real minimum wage MW; δ_{pt} denotes a province-year fixed effect and γ_c a county fixed effect.

Table II reports the regression results for the period 1992-2012 and for the shorter sample period 2002-2009 corresponding to the time frame of our analysis. We progressively augment the specification with county fixed effects and county trends to mitigate the impact of cross-sectional dependence. The coefficient of interest ρ is negative in most specifications and statistically significant. Yet, the magnitude of the mean reversion is economically weak. For instance, the coefficient in Column (4) implies a half-life of 5.47 years for the real minimum wage.[17]

We also use a unit root test (adapted to panel data) to test for real minimum wage persistence in a narrow statistical sense, Harris and Tzavalis (1999). Under the null hypothesis of a unit root (i.e. the real minimum wage increase is persistent) such tests provide a critical value for ρ below which the unit root cannot be rejected. The H-T test confirms the persistence of the minimum wage when we do not demean the real minimum wage to take into account cross-county dependence. However, when we compute in each time period the mean of the minimum wage across counties and subtract this mean from the series, the test rejects the null.[18]

Another important issue is the extent to which a change in the minimum wage can be predicted by Chinese households. In Appendix A, we describe in detail the institutional setting for minimum wage changes in China and the predictability of minimum wage hikes given public information sources. Tables A-I, A-II and A-III shows for a wide range of regression specifications that the decision to change the minimum wage is not predicted by standard socio-economic and political determinants. As county-level changes in the nominal minimum wage are very difficult to predict, we can interpret them as unanticipated income shock.

3 Research Design

3.1 Is There a Correlation Between Consumption and Minimum Wage Hikes?

Various economic channels could potentially generate a spurious correlation between both variables and could obscure a causal effect of minimum wages on consumption. Before we explore the causal link from minimum wages to household consumption, it is useful to establish that in our Chinese

[17] Half-life is computed adjusting the standard formula to take into account that we are using the first difference of the minimum wage as dependent variable: $ln(0.5)/ln(-0.119 + 1) = 5.471$. Using the coefficient in Column (8) implies a half-life of 2.31 years.

[18] To corroborate these findings, we also undertake the Im et al. (2003) test, which relaxes the assumption about the common autoregressive coefficient and runs the test for each cross-section under the null that *all* panels have unit roots, against the alternative that *some* panels are stationary. This test fails to reject the null hypothesis except when we include a time trend and demean the series to reduce the influence of cross-section dependence.

data minimum wages and consumption correlate *only* for minimum wage dependent households. To convince the reader that spurious correlations for non-minimum wage households do not obstruct the analysis, we apply a simple event analysis based on a two-step procedure.

In a first-stage regression, we regress the county-level real minimum wage MW_{ct} on a set of interacted province fixed effects $D_{Province}$ and year fixed effects D_{Year}. The resulting residuals identify if the minimum wage level in a country (or city) is high relative to the province average in a given year. Formally,

$$MW_{c,t} = \alpha_0 + \alpha_1 \left[D_{Province} \times D_{Year}\right] + u_{c,t}. \tag{3}$$

In a second step, we fit household consumption changes ΔC_b to the changes in county-level residuals $\Delta u_{c,t}$. In the absence of other economic channels, a positive correlation between the minimum wage change and consumption changes should appear only for households depending on minimum wages ($S > 0$). To visually inspect this fit, we sort the residual county changes $\Delta u_{c,t}$ into 40 bins of counties with a similar residual and calculate the bin average Δu_b for each bin b. Accordingly, we calculate for all counties in the same bin the corresponding average changes of household consumption ΔC_b. In this aggregation, we distinguish minimum wage dependent households ($S > 0.5$) from those without minimum wage income ($S = 0$). Averaging within the bins yields average consumption changes $\Delta C_b^{S>0.5}$ and $\Delta C_b^{S=0}$. Note that, within a bin, the two groups of households share the common minimum wage change Δu_b relative to the province-level average. Figure II illustrates the binned scatter plots for the two regressions

$$\Delta C_b^{S>0.5} = \beta_0 + \beta_1 \Delta u_b + \epsilon \tag{4}$$

$$\Delta C_b^{S=0} = \gamma_0 + \gamma_1 \Delta u_b + \epsilon, \tag{5}$$

where we our test requires $\beta_1 > 0$ and $\gamma_1 = 0$. Consumption changes for non-minimum wage households, $\Delta C_b^{S=0}$, show a correlation of -0.03 with the relative minimum wage change Δu_b, whereas minimum wage dependent households show a positive correlation of 1.42. A standard t-test for the statistical difference of the two slopes produces a t-statistic of 1.56. Despite the weak statistical significance, it can be inferred from the scatter plot that minimum wage increases are indeed associated with higher household consumption for minimum wage dependent households.

A further refinement of the procedure distinguishes two subsamples: (i) counties in which the nominal minimum wage was constant from one year to another, (ii) those where local authorities implemented nominal minimum wage hikes. In the former case, the county minimum wage decreases with respect to the province-year average, whereas in the latter case, the county minimum wages

increase relative to the province average. The implications for household consumption differ in the two subsets: we expect a positive relationship ($\beta_1 > 0$) between consumption changes in minimum wage households and county minimum wage changes only in counties which actively implemented a minimum wage hike. In Figure III, we compare the regression lines for cases (i) and (ii) and confirm the conjectured relationship. Only counties with a local minimum wage increase feature a correlation between consumption changes in minimum wage households and the residual change Δu_b. Minimum wage households show no consumption changes in counties where the nominal minimum wage was constant.

To sum up, only in counties with local minimum wage hikes do we find a positive correlation with household consumption changes, and this correlation pertains only to minimum wage dependent households.

3.2 Panel Data Methods

The large spatial and intertemporal variation of minimum wages across Chinese counties suggest a panel analysis to identify and estimate the minimum wage elasticity of consumption. We design a difference in difference specification which compares household consumption across counties subject to minimum wage hikes (treatment group) and not (control group). In light of the heterogeneous household exposure to minimum wage income, we segment the household sample into groups according to their share S of total income received from minimum wage labor. Households without any minimum wage related income ($S = 0$) represent an additional control group relative to those household with $S > 0.5$ ($S > 0.75$) which earn more than 50% (75%) of their total income from minimum wages.

The household survey data provide a rich set of demographic and socio-economic characteristics ($\boldsymbol{X}_{m,h,t}$) for the two main labor income earners ($m = 1, 2$) in the households. For the purpose of the analysis, we use as controls their age and age squared, gender, years of work experience and work experience squared, years since migration to the city and its squared value. Additional categorical covariates include marital status, level of education, occupation and industry of occupation. The observed household characteristics ($\boldsymbol{X}_{h,t}$) include household size measured by the number of household members, and a house ownership dummy.

One of the advantages of the urban household consumption and income survey data is that we observe directly transfer income to households and its sub-components. We exploit this data richness to identify the minimum wage elasticity of consumption since minimum wage changes may correlate with transfer changes. In addition to transfer income, we also observe household net operating income from business, household income from lending activity and income from property. At the city level,

we dispose of a variety of macroeconomic variables that we use as controls in some specifications ($\boldsymbol{X}_{city,t}$): population size, city real GDP, city real average wage and city unemployment rate. These variables are not available at the more granular county level, hence we generally allow for different growth trends at the county level including the interaction of a county dummy and a time trend ($\phi_c \cdot t$) in the regression. The reduced form specification of the household consumption equation follows as

$$C_{h,c,t} = \alpha + \beta^{RF} MW_{c,t} + \boldsymbol{X}_{m,h,t}\boldsymbol{\Lambda} + \boldsymbol{X}_{h,t}\Theta + \boldsymbol{X}_{city,t}\Xi + \phi_c \cdot t + \eta_h + \delta_{p,t} + \varepsilon_{h,c,t}, \tag{6}$$

where the subscript h characterizes the household, c the county and t the year. The specification also accounts for household fixed effects η_h and province-year fixed effects $\delta_{p,t}$ to allow for heterogeneous economic developments across China's main geographic regions. All monetary variables, including the minimum wage, are defined in real terms using the province-level consumer price index. The coefficient of interest in this reduced form specification is the linear effect β^{RF} of the minimum wage level MW_{ct} on household consumption $C_{h,c,t}$.

A more general approach relates household consumption to household income by using the minimum wage change as an instrument to explain variation in household income. In China, the large and frequent variation of the real minimum wage guarantees that the explanatory power of the first-stage regression is sufficiently large. This two-stage least square estimation (2SLS) first explains household labor income using a first-stage regression

$$Income_{h,c,t} = \alpha + \beta^{FS}\ MW_{c,t} + \boldsymbol{X}_{m,h,t}\boldsymbol{\Lambda} + \boldsymbol{X}_{h,t}\Theta + \boldsymbol{X}_{city,t}\Xi + \phi_c \cdot t + \eta_h + \delta_{p,t} + \varepsilon_{h,c,t}, \tag{7}$$

and in the second stage relates the predicted income variation $\widehat{Income}_{h,c,t}$ induced by minimum wage variation to account for household consumption, therefore

$$C_{h,c,t} = \alpha + \beta^{2SLS}\ \widehat{Income}_{h,c,t} + \boldsymbol{X}_{m,h,t}\boldsymbol{\Lambda} + \boldsymbol{X}_{h,t}\Theta + \boldsymbol{X}_{city,t}\Xi + \phi_c \cdot t + \eta_h + \delta_{p,t} + \varepsilon_{h,c,t}. \tag{8}$$

The advantage of the 2SLS approach is that it accounts explicitly for the channel through which minimum wages affect consumption. Intuitively, and conditional on covariates, 2SLS retains only the variation in household labor income that is generated by the minimum wage instrument, and thus provides a cleaner estimate of the direct impact induced by the minimum wage change, Angrist and Pischke (2008).

The inclusion of county-level time trends $\phi_c \cdot t$ is important. We thus control for county-specific consumption trends as macroeconomic control variables at the local level are not available. If we do not allow for heterogeneous trend growth, the real minimum wage level $MW_{c,t}$ becomes the only

county-level regressor, and could subsume county-level heterogeneity and bias the inference. It is straightforward to illustrate this specification issue by comparing first-stage income regressions with and without county time trends; the results are shown in the Appendix Table A-VI. In the standard two-way specification with only time fixed effects, but without county time trends and interacted province-year fixed effects, the correlation between the real minimum wage and household income is spuriously and highly significant even for the household groups not earning any minimum wage income ($S = 0$) as shown in Column (1) of Table A-VI. By contrast, county time trends in Columns (5)-(8) in combination with province-year fixed effects capture unobserved heterogeneity in economic development trends across counties and are successful in eliminating any spurious consumption dependence of high income households on the level of the minimum wage. As a consequence, we always present estimates including both linear county trends and province-time fixed effects.

4 Main Results

4.1 First-Stage Income Regressions

Table III presents estimates for the first-stage regression for different definitions of household income. We distinguish among pure labor income in Columns (1)-(3), transfer income in Columns (4)-(6) and the sum of labor and transfer income in Columns (7)-(9) as the dependent variables. We consider three household groups: those that receive at least 25% ($S > 0.25$), at least 50% ($S > 0.5$), or at least 75% ($S > 0.75$) of their total income from minimum wages, respectively. All specifications include county trends and province-year fixed effects to account for unobserved heterogeneity. We also report three different types of standard errors: two-way clustering at county and province-year levels, and two way-clustering at county and city-year levels.[19]

The first-stage regression provide information which component of household income is affected by the minimum wage change. For example minimum wage increases can be accompanied with higher social transfer payments as part of a comprehensive county level social security benefits policy, so that minimum wage increases also predict increases in social transfers in Columns (4)-(6) of Table III. Alternatively, minimum wage increases can crowd-out transfer income if the latter is subject to eligibility requirements that depend on the labor income. In both cases the impact of the minimum wage on consumption can be biased if transfers are not included in the specification. [20]

The results of the first-stage regressions indicate a positive effect of minimum wages on labor

[19]Two-way clustered standard error allow for arbitrary correlation of residuals due to city/province-wide shocks such as floods, earthquakes or city/province-wide economic policies.

[20]Transfers are intended net of pension or retirement benefits. The measure of net transfers includes social assistance income, dismissal compensation, income insurance, income from donations and other transfer income.

income in Columns (1)-(3). This increases in the minimum wage share S of household income, and is significant only for households earning more than half of their disposable income from minimum wages. The coefficient of 1.56 in Column (3) suggests that income elasticity is larger than one for households with a strong minimum wage dependence. This can be explained by the presence of multiple minimum wage earners in the same household. Given the standard error of 0.743, the t-statistic is 2.104 and signals a sufficiently strong instrument.[21] More surprising is the large positive predictive effect that minimum wages have for transfer income in the same household group. A positive coefficient of 1.09 in Column (6) implies that a RMB 1,000 increase in the annual minimum wage comes with an equally large increase in social transfers.

Accordingly, we find much larger coefficients for the minimum wage effect on the combined labor and transfer income of households. The total household income effect of minimum wage changes is roughly 2.5 times the variation in the annual minimum wage at the county level. For a county clustered standard error of 0.729, the t-statistic approaches the value of 3 and the F-statistics is close to 10. This implies that we dispose of a better instrument if we focus on the sum of labor and transfer incomes as unique endogenous variable. It follows directly that the related 2SLS estimates will be more precisely estimated as shown in the Section 4.3.

4.2 Reduced Form Regressions

In this section the reduced form estimates for the relationship between the real minimum wage and consumption are presented. Table IV presents two different specifications.

First, Columns (1)-(4) report the standard specification adopted in the minimum wage literature on the impact of minimum wages on some outcome of interest, Aaronson et al. (2012), Allegretto et al. (2011) and Neumark et al. (2014a). This work controls for *all* non-labor income sources. The second group of estimates in Columns (5)-(8) exclude transfer income as a covariate and therefore allow the effect of transfer income on consumption to be captured by the minimum wage change itself. The resulting coefficient is inflated upwards since the minimum wage estimate captures the additional effect of (correlated) net transfers. Note that the point estimates increase noticeably only for households with $S > 0.5$ —suggesting that net transfers have a significant contribution in terms of consumption exclusively for households with a higher minimum wage dependence. For minimum wage dependent households, the relative incidence of net transfers on consumption is substantial given that net transfers (net of pensions) constitute around 20% (8%) of household disposable income as shown

[21] Note further that a single instrument 2SLS is median-unbiased and hence less prone to weak instrument critique, Angrist and Pischke (2008). A more formal test of the validity and relevance of first stage instruments is from Kleibergen and Paap (2006) and is provided in the 2SLS regressions in Table V.

in Table A-IV in Appendix B.

In both specifications the point estimate for the annual real minimum wage effect on household consumption increases in the minimum wage share S of household income dependence. For the households most dependent on minimum wage income ($S > 0.75$), the coefficient of interest becomes 2.05 (standard error 0.89) if we control separately for transfer income in Column (4); the estimate increases to 2.52 (standard error 0.88) in Column (8) where the minimum wage simultaneously captures variations in transfer income and its complementary consumption effect.

The first set of specification in Columns (1)-(4) is preferable when it comes to an evaluation of the elasticity of consumption with respect to minimum wage income only. An elasticity estimate of RMB 2.05 with respect to the annual minimum wage is perfectly plausible for a household of two earners. Indeed, households earning more than three-quarters of their total income from minimum wages typically have both members employed on minimum wages. Hence household consumption responds one-to-one to their combined minimum wage income increase.

4.3 Two-Stage Least Square Estimates

In this section we present two-stage least squares (2SLS) estimates for the effect of minimum wage hikes on consumption. By construction only the part of the minimum wage variation reflected in household labor income is used to infer the income elasticity of consumption. This may attenuate the role of measurement errors with respect to the minimum wage or its heterogeneous implementation. Again we operate with different definitions of household income. However, both labor income and consumption are measured at the household level and allow for a more intuitive interpretation of results.

Table V presents the 2SLS estimates of household consumption as a function of real labor income in Columns (1)-(4) and as a function of the sum of labor and transfer income in Columns (5)-(8). We note that consumption elasticity is more precisely estimated as the minimum wage share S increases, because the instrument quality increases in S. For households earning more than three-quarters of their disposable income through minimum wage labor [Column (4)], a RMB 1000 rise in income increases consumption by RMB 1314. However, the standard errors are relatively large and we cannot exclude an elasticity lower than one.

Estimating consumption response as a function of the sum of labor and transfer income yields consumption elasticities closer to unity and considerably smaller standard errors. For minimum wage dependent households with $S > 0.75$ in Column (8), the point estimate is 1.02 with a robust standard error of only 0.35. The lower standard errors in Columns (5)-(8) result from higher explanatory power

of the minimum wage instrument if we use a more comprehensive definition of the income shock. In both sets of specifications, we reject the null hypothesis of irrelevant or weak instrument using the Kleibergen and Paap (2006) test only for households earning more than half of their disposable income from minimum wage labor. This suggests that for the 2SLS specification the minimum wage hike instrument for labor income shock is not strong enough and findings for the households with < 0.5 should be interpreted with caution. Finally we note also that p-values for the weak instrument test are generally lower in Columns (5)-(8) when the minimum wage instrument is used to fit labor and transfer income simultaneously.

Overall, we infer from the 2SLS estimates that minimum wage dependent households in China fully spend their labor and transfer income changes induced by the minimum wage increase. We report robust results for different type of clustering of standard errors clustered at county level, two-way clustered at county and city-year level and two-way clustered at county and province-year level.

As the minimum wage income increases tend to be both unanticipated and persistent (see Table II and Appendix A.1), we can also interpret these results as consistent with the permanent income hypothesis, Jappelli and Pistaferri (2010). It is also instructive to compare the 2SLS estimates of consumption propensity with similarly specified OLS estimates with household fixed-effects and province-year fixed effects reported in Table A-VII in Appendix D. The OLS estimates are considerably smaller and range between 0.33 and 0.44. What can explain this large difference in the 2SLS estimates? First, standard and more predictable income changes that do not originate from minimum wage variation could generally be more transitory and therefore subject to more consumption smoothing, which would imply a lower elasticity of consumption. Second, reporting and measurement errors with respect to household income itself can attenuate the OLS estimate. At the same time, such measurement errors are likely to be orthogonal to the minimum wage variation so that the 2SLS estimate remains consistent.

4.4 Health and Education Expenditure

An extensive economic literature has documented a positive relationship between health and education on the one hand and productivity and long-run income on the other, Mincer, Bloom and Canning (2000). Therefore, health and educational expenditure present a particular item of interest indicative of the welfare of a household and its children. The household survey data allow us to examine these consumption items separately and document their relationship to the minimum wage level. From a public policy perspective, higher consumption of both health and educational expenditure of low income households in China is particularly desirable given the weakness of China's public health system

and often costly access to quality education as documented for instance by Chamon and Prasad (2010).

Table VI reports 2SLS estimates of the household consumption equation for annual real health expenditure in Columns (1)-(3), for real educational expenditure in Columns (4)-(6) and their sum in Columns (7)-(9). As before, we consider household subsamples with a share S of minimum wage income of at least 25% ($S > 0.25$), 50% ($S > 0.25$), or 75% ($S > 0.75$) of total household income. For households with the highest minimum wage dependence ($S > 0.75$), we find that a RMB 1,000 higher annual minimum wage is associated with a higher health expenditure by RMB 226 and higher educational expenditure by RMB 205. Therefore, more than 40% of any minimum wage increase is spent either on health or education. This result is confirmed in Column (9) which pools health and educational expenditure as a single dependent variable. The standard error is 0.151 and the estimate is significant at 1% level. Increased health and educational spending represent substantial portion of the overall consumption response to minimum wage increases. The 40% expenditure share for a *marginal* minimum wage income hike is very large when compared to the much lower 15% *average* expenditure share of health and educational spending combined, see Table A-IV in Appendix B.

The estimates show that higher minimum wages are mostly used by relatively poor household to compensate for incomplete public provision of health and educational services. This result confirms the findings of Chamon and Prasad (2010) that associate costly education and poor public health provision with the high saving rates of Chinese households.[22] We interpret the finding of the large educational expenditure share for additional minimum wage income as a strong inter-generational bequest motive with respect to human capital. Educational spending is regarded as an investment into a higher future household income. In the context of the one-child-policy, parental aspirations typically focus on a single child and educational investment in the child may also serve as a retirement insurance for parents.

5 Household Heterogeneity

5.1 Liquidity Constraints

Consumption effects of incremental disposable income documented in Section 4 could be the result of borrowing constraints, Zeldes (1989), Jappelli and Pistaferri (2010). In a high income growth environment like China, households may expect a life-time income which justifies a desired consumption level larger than current disposable income, but borrowing constraints enforce a lower consumption

[22] In a separate set of regressions we interacted health and education expenditure with the number of children in the household. The estimates show that around 25% of the combined health and education response to minimum wages comes from households with children. However the interaction terms are not significant at standard confidence levels.

level equal to disposable income. A higher minimum wage alleviates these expenditure constraints and this may explain the high consumption propensity. Indeed, minimum wage households are inherently liquidity constrained due to their low proceeds from labor and generally a lack of collateral to pledge against a loan. It is therefore possible that the findings in the previous section are driven by the inability to smooth consumption over time.

If financial constraints contribute to higher consumption propensities, we expect financially unconstrained households to feature lower consumption propensities of minimum wage income. We identify three variables as proxies for financially unconstrained households, namely those with access to additional liquidity. First, we define a dummy indicating that the household has property income. Property serves as collateral in credit relationships and may be used to guarantee a loan. In the sample, roughly 14% of low income households with $S > 0.5$ dispose of property income and may therefore be less likely to face borrowing constraints.[23] Second, we identify households with interest, dividend or insurance income. The respective dummy variable takes on the value one for 7% of all households with $S > 0.5$. Third, we define outright home ownership households as those who own a house and do not have to make mortgage payments. Contrary to non-owners or owners with mortgage debt, outright home owners can pledge their property as collateral to obtain loans and smooth consumption behavior over the life-cycle. Yet, ownership rates are extremely high at 76% even among relatively poor minimum wage households ($S > 0.5$) and the house value may often be so low that even outright ownership does not necessarily imply access to credit.

Table VII reports how the three proxies for credit access interact with the consumption propensity in the 2SLS setting. Columns (1)-(3) show how consumption elasticity with respect to labor and transfer income differs from the baseline coefficient when interacted with the property income dummy. Households with property income above the median, and medium ($S > 0.5$) or high ($S > 075$) minimum wage dependency, consume roughly 30% less of instrumented income variation compared to the majority of households without property income. Columns (4)-(6) mark minimum wage households with financial assets; but their consumption propensity is not statistically significantly different from other minimum wage dependent households. Finally, outright house ownership reported in Columns (7)-(9) does not appear to matter much for a household's consumption propensity. The coefficient of -0.121 for the interaction term in Column (9) is economically small and again statistically insignificant. These results suggest that variations in liquidity access (identified by our proxies) do not seem to matter for the high propensity to consume addition minimum wage income. Overall, we find little empirical

[23] Among households with some income from property, the mean income from property is RMB 2,957 per year, and the median RMB 630. We construct the dummy (=1) if income from property is above the median of RMB 630 per year.

support for the hypothesis that liquidity constraints drive the high consumption propensities found in Section 4.

5.2 Household Structure

The large household propensity to spend a higher minimum wage income on education suggests that household structure matters for the consumption behavior. The one-child policy implies a predominance of single child households: the majority of households in the UHS sample have one child (77%), households with two children represent 14.5%, childless households are 6.5%, and only 2% of household have more than two children.[24]

The Chinese one-child policy is often blamed for an unbalanced gender ratio between girls and boys because abortions are practiced more frequently if the fetus is female. Some authors claim that this gender imbalance has consequences for the marriage market in which competition for brides requires young unmarried men to demonstrate wealth and real estate ownership. The marriage motive could generate higher savings rates among households with a male child and in particular with a male child of adult age, Wei and Zhang (2011), Rosenzweig and Zhang (2014).

Table VIII reports the minimum wage elasticity of consumption, where labor and transfer income in Columns (1)-(3) is interacted with a dummy for children in the household, in Columns (4)-(6) with a dummy for a male child, and in Columns (7)-(9) with a more restrictive dummy identifying only male children of 24 years of age (adult male child). The 2SLS estimates in Column (3) provide evidence that a high consumption propensity of minimum wage income is related to children in the household. In fact, childless families with the highest minimum wage dependency ($S > 0.75$) show a lower point estimate for minimum wage elasticity of consumption and only households with at least one child show a minimum wage income elasticity of consumption close to one.[25] We infer from Column (6) that the male gender of a child makes only an economically small and statistically insignificant difference to consumption behavior. Male children of adult age increase rather than reduce consumption on average, but the estimated effects are statistically indistinguishable from zero.

While children in a household boost propensity of consumption of minimum wage income considerably, there is no support for a gender-based saving bias in low income households dependent on

[24] Besides simple non-compliance, a series of exceptions to the one-child policy can be highlighted and are documented for China. For instance a time distance of four to six years between two births may provide a justification for two children, rural families can have two children if the first baby is a girl, and further exemptions exist on ethnic and economic considerations, Gu et al. (2007).

[25] In a separate set of regressions we also test for incremental minimum wage effects on consumption in the one-child household group and compare it to households without children. The estimated interaction coefficient of the dummy for one child is larger than the generic dummy for children in Table VIII. Moreover, we compare one-child households with multiple children households to see if the one-child saving motive holds; yet we do not find significantly different consumption responses across these household groups.

minimum wages. Consistently, our identification strategy does not allow us to generalize this finding to wealthier families for which minimum wages do not matter. As aggregate saving rates depend mostly on the saving behavior of middle and high income families, we need to be careful not to extrapolate these findings for low income families to the Chinese aggregate macroeconomic saving behavior as a whole.[26]

6 Robustness: Parallel Trends

The difference-in-difference estimation requires the parallel (common) trend assumption to hold, whereby the outcome variable in the treatment and control group should exhibit similar trends before treatment occurs, and these trends persist in the absence of treatment. Anticipation effects of policy change or diverging pre-existing trend can bias the inference. We therefore seek to show a high degree of synchronization between consumption changes and minimum wage changes.

To validate our research design, we nest household consumption in a more general specification, which allows for asynchronous effects in a two year window around the implementation of the minimum wage change. Formally, we estimate the augmented reduced form

$$C_{h,c,t} = \alpha + \sum_{k=-2}^{+2} \beta_k^{RF} MW_{c,t+k} + \boldsymbol{X}_{m,h,t}\boldsymbol{\Lambda} + \boldsymbol{X}_{h,t}\Theta + \boldsymbol{X}_{city,t}\Xi + \phi_c \cdot t + \eta_h + \delta_{p,t} + \varepsilon_{h,c,t}, \quad (9)$$

where the parameter of interest β_k^{RF} takes on different time subscripts to capture a persistent or anticipated consumption response relative to the date of minimum wage changes. We use time lags of $k = -1, -2$ years or time leads of $k = +1, +2$ years. The lead coefficients are like placebo events for the parallel trend assumption and should exhibit a zero consumption response to rule out confounding parallel trends, hence $\beta_k^{RF} = 0$ for $k > 0$. The lagged coefficients instead provide information on the duration of the impact, i.e. if the minimum wage effect on consumption is persistent over time. By including county linear time trends in the regression, $\phi_c \cdot t$, our specification seeks to identify a sharp contemporaneous relationship between variation of consumption and minimum wage variation even under confounding county-level trends.

Table IX reports the augmented specification. Columns (1)-(4) presents elasticity of consumption estimates for two periods of lagged response ($k = -1, -2$), and Columns (5)-(8) for two periods of lead response ($k = +1, +2$). The latter specifications nest any anticipation effect for the minimum wage increase. In both specifications the contemporaneous response is positive, statistically significant, and

[26] We tried to explore further the heterogeneity of the minimum wage impact on consumption by looking at interactions with urban immigrant households, households with debt, female headed households and the education of the head of the households. None of these characteristics have significant interactions with the minimum wage.

consistent with the findings in Section 4. By contrast, the first lag and lead of the minimum wage have a negative sign and are statistically insignificant; and neither do the second lag or lead matter from a statistical point of view. We therefore find no evidence for policy anticipation effects on household consumption or for persistent effects over time. Instead we find that the consumption response occurs contemporaneously to the minimum wage change and is not affected by divergent trends.

7 Conclusion

This study provides evidence for a positive unitary minimum wage elasticity of consumption and is the first to estimate the consumption and income response of Chinese households to the large cross-sectional and intertemporal variation of China's minimum wages. For the period 2002-2009, we identify more than 13,874 changes in the local minimum wage across China's 2,183 counties and 285 cities, and match them to the urban household survey (UHS) which covers 73,164 urban household-year observations.

The main finding of the analysis is that higher household incomes after a minimum wage hike are generally fully spent by minimum wage dependent households. The relationship is stronger for households composed of two minimum wage earners and the effect is driven by households with children, whereas households without children feature higher saving rates. The study also finds that roughly 40% of additional minimum wage income is in fact "invested" in health care and educational spending with potential long-term benefits for household welfare.

Consumption effects of incremental disposable income could be the result of borrowing constraints. Given the high rate of income growth in China and a perception of relaxed liquidity constraints, households may expect a lifetime income that justifies a consumption level above the current disposable income. This paper tests if the consumption effect due to the minimum wage hike is driven by borrowing constraints. It finds that the minimum wage elasticity of consumption does not differ significantly when we compare more or less liquidity-constrained households.

The study finds also some evidence of complementarity between minimum wages and other transfers from social policies. In fact, local minimum wage increases are strongly associated with increased (rather the decreased) social transfers for households earning more than 75% of their disposable income from minimum wages. For this group social transfers therefore magnify the income effect of minimum wage hikes on consumption. This suggests that local minimum wage increases in China are often part of a more comprehensive social policy towards low-income households. At the same time, households earning less than 25% of their income from minimum wages do not experience commensurate effects in their transfer income when minimum wages increase.

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Figure I:
Minimum Wage Variation

Proportion of counties increasing their nominal minimum wage in China, 1996-2012. We plot by year the percentage of China's 2,183 counties and 285 cities in our sample with a strictly positive minimum wage change between 0 and 10%, between 10% and 20%, and above 20%, respectively. The column height represents the combined share of counties experiencing an increase of their nominal minimum wage in a given year.

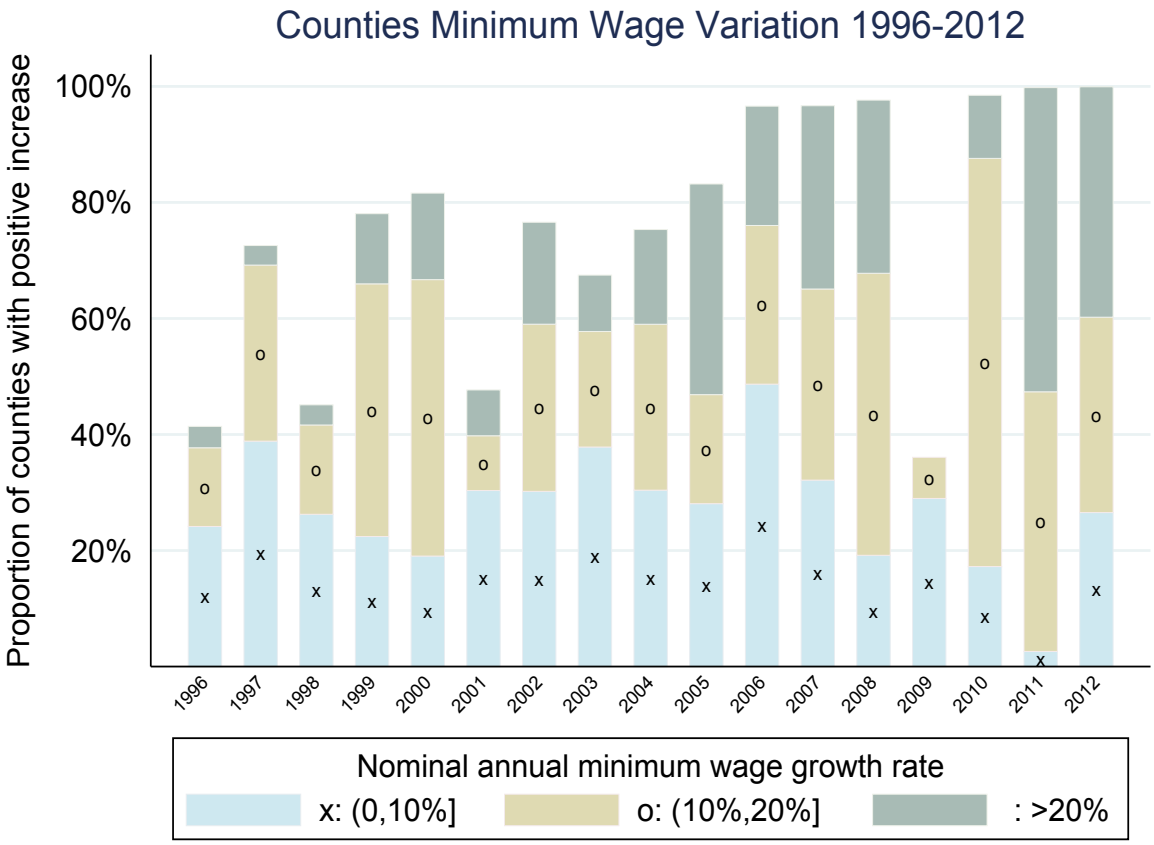

Figure II:
Household Consumption and County Minimum Wages - I

Average real consumption changes are plotted for minimum wage dependent households ($S > 0.5$, red crosses) and those without minimum wage income ($S = 0$, blue dots). We sort all households into 40 bins according to the magnitude of the local real minimum wage increase relative to province-level average minimum wages. The dashed line represents the fitted linear relationship for minimum wage dependent households and the solid line for households without minimum wage income. The source regression has 32,355 household-level observations. A standard t-test for the statistical difference of the two slopes produces a t-statistic of 1.56

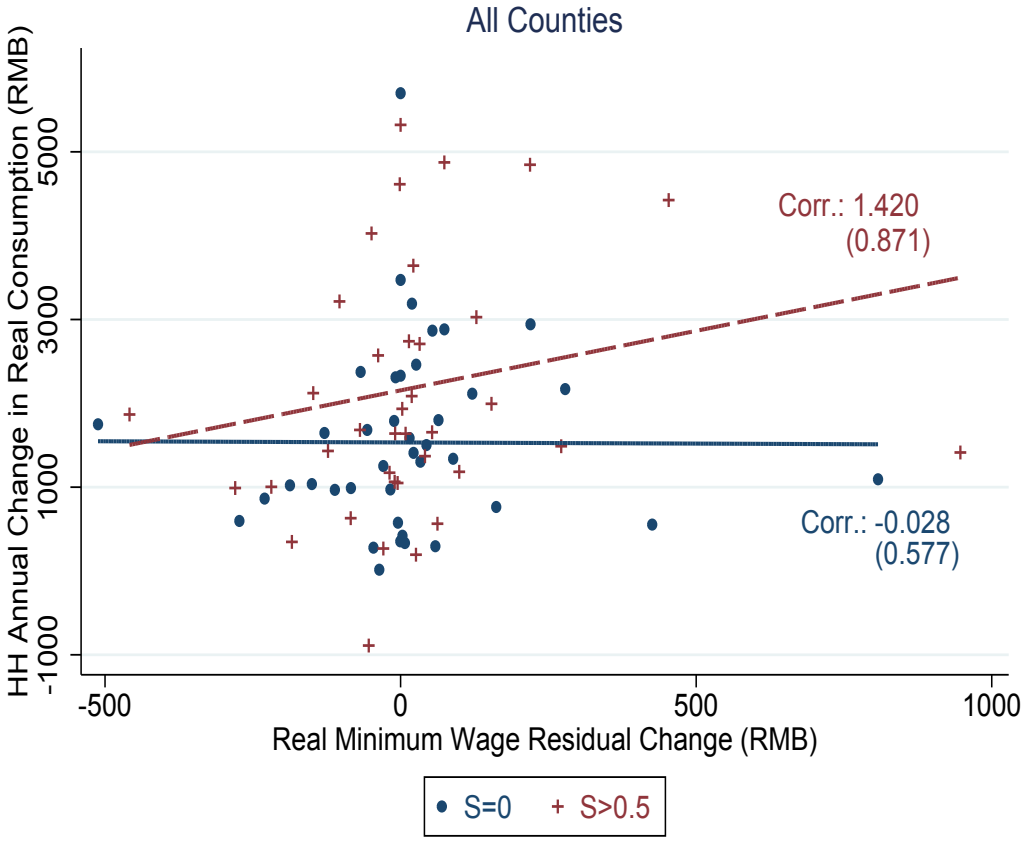

Figure III:
Household Consumption and County Minimum Wages - II

After sorting counties into those with and without a nominal minimum wage change in a given year, we proceed as in Figure 2: average real consumption changes are plotted for minimum wage dependent households ($S > 0.5$, red crosses) and those without minimum wage income ($S = 0$, blue dots). In each panel households are sorted into 40 bins according to the magnitude of the local real minimum wage increase relative to province-level average minimum wages. The dashed line represents the fitted linear relationship for minimum wage dependent households and the solid line for households without minimum wage income.

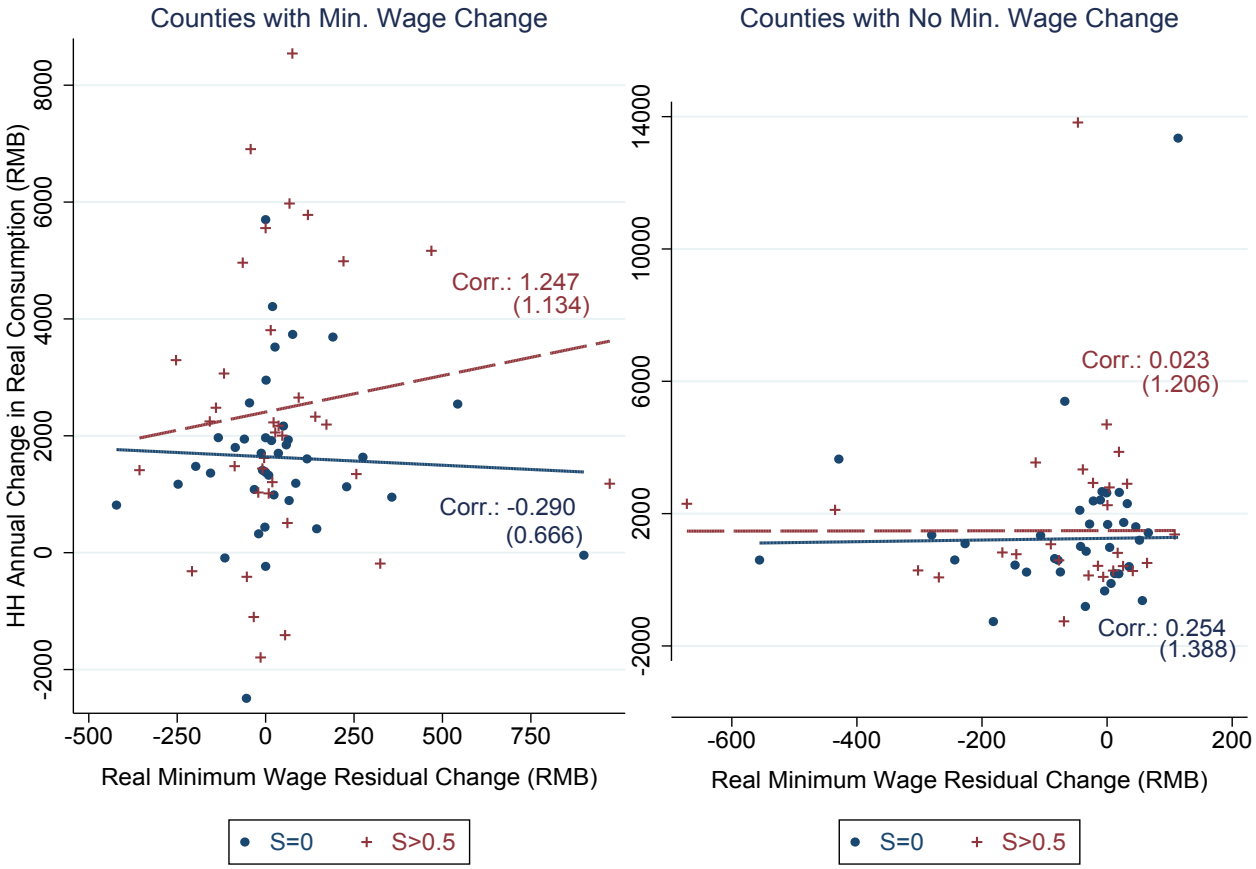

Table I:
Labor Supply and Minimum Wage Bite

The table reports the monthly supply of working hours for the entire cleaned sample of urban full-time workers (Panel A) and only for the subset of workers in minimum wage households (Panel B). For both groups, the monthly hours worked are reported for counties that have a change in the minimum wage (treated) compared with counties without minimum wage change (control). A t-test for the difference of the means between these two groups is also presented with clustered standard errors at the county level in parenthesis. Labor supply in terms of monthly hours worked is not available for the years 2007-2009. Panel C reports also average minimum wage bite by year and the annual growth rate of the real minimum wage. The minimum wage bite is computed as the ratio of the minimum wage (MW) to the median wage in each county and then averaged across counties. Standard errors are provided in parentheses.

Year	2002	2003	2004	2005	2006	2007	2008	2009
Panel A: Workers in all households								
Monthly hrs MW treated counties	167.2	166.0	164.3	167.7	168.2	–	–	–
	(54.48)	(58.62)	(58.19)	(57.14)	(56.38)			
Monthly hrs control counties	164.3	163.7	167.8	165.1	177.8	–	–	–
	(58.16)	(56.78)	(56.21)	(60.34)	(69.02)			
T-test	2.99	2.33	−3.48	2.61	−9.59	–	–	–
	(2.35)	(2.04)	(1.99)	(2.40)	(6.12)			
Observations for t-test	31657	41654	43808	44027	38910	–	–	–
Panel B: Workers in MW households								
Monthly hrs MW treated counties	162.1	160.7	160.0	163.8	164.1	–	–	–
	(63.11)	(68.41)	(66.04)	(65.41)	(64.94)			
Monthly hrs control counties	156.5	160.3	162.4	159.2	174.5	–	–	–
	(68.33)	(62.72)	(64.27)	(73.56)	(76.96)			
T-test	5.60	0.46	−2.45	4.61	−10.37	–	–	–
	(2.57)*	(2.49)	(2.51)	(4.31)	(7.51)			
Observations for t-test	8065	10406	10705	10828	9240	–	–	–
Panel C: MW bite								
MW relative to median wage	0.202	0.201	0.197	0.198	0.201	0.185	0.189	0.176
	(0.042)	(0.043)	(0.046)	(0.045)	(0.045)	(0.045)	(0.053)	(0.045)
Real MW growth	12.99	7.97	8.71	12.32	7.53	8.74	8.92	8.04
	(7.71)	(6.24)	(8.17)	(6.96)	(6.83)	(8.07)	(6.11)	(2.61)

Table II:
Persistence of Real Minimum Wage Shock

We regress changes in the real minimum wage (ΔMW_{ct}) on the lagged real minimum wages (MW_{ct-1}) controlling for trend growth. The regressions add county or province-year fixed effects as specified in Equation (1) to limit the influence of cross-county spatial dependence. A significant negative coefficient implies reversion of the minimum wage shocks to trend growth. Standard errors clustered at county level are shown in parentheses.

Dep. variable:	Real minimum wage change, $\Delta MW_{c,t}$							
	1992-2012				2002-2009			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$MW_{c,t-1}$	-0.005	0.022	-0.118	-0.119	-0.031	0.023	-0.259	-0.260
	(0.003)	(0.003)	(0.008)	(0.009)	(0.005)	(0.003)	(0.011)	(0.012)
Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province-year FE		Yes	Yes	Yes		Yes	Yes	Yes
County FE			Yes				Yes	
County Trend				Yes				Yes
Obs.	37320	37320	37320	37320	17464	17464	17464	17464
N. clusters	2183	2183	2183	2183	2183	2183	2183	2183
R^2	0.310	0.862	0.871	0.876	0.011	0.810	0.842	0.852

Table III:
Household Income Sources and the Real Minimum Wage

We regress the levels of household real annual labor income in Columns (1)-(3), transfer income in Columns (4)-(6), and their sum in Column (7)-(9), on the local effective real minimum wage level. The samples consist of all households for which the labor income share S from wages near the minimum wage represents more than 25% ($S > 0.25$), or more than 50% ($S > 0.5$), or more than 75% ($S > 0.75$) of household labor income. All regressions include household, county and interacted province-year fixed effects, city level controls and county time-trends as specified in Equation (7). We report standard errors clustered at county level in parentheses, two-way clustered at county and city-year level in brackets and two-way clustered at county and province-year level in curly brackets.

Dep. variables:	Household Labor Income			Household Transfer Income			HH Labor and Transfer Income		
MW dependency:	$S > 0.25$	$S > 0.5$	$S > 0.75$	$S > 0.25$	$S > 0.5$	$S > 0.75$	$S > 0.25$	$S > 0.5$	$S > 0.75$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Minimum wage	0.710	1.378	1.563	0.308	0.767	1.091	0.965	2.017	2.475
	(0.522)	(0.636)	(0.743)	(0.209)	(0.567)	(0.577)	(0.581)	(0.729)	(0.758)
	[0.540)	[0.675)	[0.772]	[0.217]	[0.575]	[0.581]	[0.600]	[0.754]	[0.934]
	{0.592}	{0.754}	{0.895}	{0.242}	{0.605}	{0.683}	{0.614}	{0.799}	{0.850}
City level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,031	4,267	3,899	14,031	4,267	3,899	14,031	4,267	3,899
Number of clusters	474	336	328	474	336	328	474	336	328
Adjusted R^2	0.864	0.889	0.889	0.614	0.606	0.583	0.848	0.870	0.872

Table IV:
Household Consumption and the Minimum Wage

Reduced form specifications regress the annual real household consumption in RMB on the real local minimum wage level where Columns (1)-(4) control for all non-labor income and Columns (5)-(8) for non-labor income without transfer income. The samples consist of all households for which the labor income share S from wages near the minimum wage represent a strictly positive share ($S > 0$), more than 25% ($S > 0.25$), or more than 50% ($S > 0.5$), or more than 75% ($S > 0.75$) of household labor income. All regressions include household, county and interacted province-year fixed effects, city level controls and county time-trends as specified in Equation (6). We report standard errors clustered at county level in parentheses, two-way clustered at county and city-year level in brackets and two-way clustered at county and province-year level in curly brackets.

Dep. variable:	Household Consumption							
MW dependency:	$S > 0$	$S > 0.25$	$S > 0.5$	$S > 0.75$	$S > 0$	$S > 0.25$	$S > 0.5$	$S > 0.75$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Minimum wage	0.856	1.091	1.786	2.054	0.885	1.184	2.107	2.515
	(0.567)	(0.561)	(0.782)	(0.893)	(0.575)	(0.569)	(0.829)	(0.880)
	[0.588]	[0.587]	[0.795]	[0.907]	[0.599]	[0.595]	[0.840]	[0.899]
	{0.636}	{0.623}	{0.848}	{0.987}	{0.645}	{0.656}	{0.891}	{0.925}
Controls:								
All non-labor income	Yes	Yes	Yes	Yes	No	No	No	No
Non-labor income excluding transfers	No	No	No	No	Yes	Yes	Yes	Yes
City level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,728	1,4031	4,267	3,899	19,728	14,031	4,267	3,899
Number of clusters	508	474	336	328	508	474	336	328
Adjusted R^2	0.790	0.809	0.843	0.851	0.789	0.805	0.849	0.860

Table V:
Household Consumption under Labor Income Shocks

We report 2SLS level regressions in which real annual household consumption in RMB is alternatively regressed on the household's fitted annual real labor income level in Columns (1)-(4), or the fitted annual real labor income plus transfers level in Columns (5)-(8). The first-stage regressions are reported in Table II. The samples consist of all households for which the labor income share S from wages near the minimum wage represent a strictly positive share ($S > 0$), more than 25% ($S > 0.25$), or more than 50% ($S > 0.5$), or more than 75% ($S > 0.75$) of household labor income. All regressions include city level controls, household fixed effects, interacted province-year fixed effects, and county time-trends as specified in Equation (8). We report standard errors clustered at county level in parentheses, two-way clustered at county and city-year level in brackets and two-way clustered at county and province-year level in curly brackets. The p-values in the last line refer to a test under the null hypothesis of weak instruments (Kleibergen and Paap, 2006).

Dep. variable:	Household Consumption							
MW dependency:	$S > 0$	$S > 0.25$	$S > 0.5$	$S > 0.75$	$S > 0$	$S > 0.25$	$S > 0.5$	$S > 0.75$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fitted labor income	1.687	1.538	1.296	1.314				
	(1.415)	(0.865)	(0.609)	(0.651)				
	[1.417]	[0.838]	[0.603]	[0.644]				
	{1.375}	{0.863}	{0.572}	{0.609}				
Fitted labor and transfer income					1.117	1.227	1.045	1.016
					(0.712)	(0.555)	(0.375)	(0.363)
					[0.707]	[0.539]	[0.363]	[0.354]
					{0.693}	{0.522}	{0.370}	{0.341}
City-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,728	14,031	4,270	3,903	19,728	14,031	4,270	3,903
Number of clusters	508	474	336	328	508	474	336	328
H_0: Weak instruments (p-value)	0.325	0.209	0.038	0.040	0.182	0.134	0.005	0.002

Table VI:
Household Health and Education Expenditure under Minimum Wage Income Shocks

The 2SLS level regressions of Table V, Columns (6)-(8) are repeated for sub-components of household consumption, namely health expenditure in Columns (1)-(3), education expenditure in Columns (4)-(6) and the sum of health and education expenditure in Columns (7)-(9). Standard errors in parenthesis are clustered at county level. Weak instrument row shows the p-value of the Kleibergen and Paap (2006) test under the null of weak instrument.

Dep. variables:	Health Expenditure			Education Expenditure			Health + Education Exp.		
MW dependency	$S > 0.25$	$S > 0.5$	$S > 0.75$	$S > 0.25$	$S > 0.5$	$S > 0.75$	$S > 0.25$	$S > 0.5$	$S > 0.75$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Fitted labor and transfer income	−0.047	0.224	0.226	0.230	0.183	0.205	0.184	0.406	0.431
	(0.143)	(0.128)	(0.120)	(0.196)	(0.146)	(0.133)	(0.209)	(0.164)	(0.151)
City-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,676	3,876	3,538	12,676	3,876	3,538	12,676	3,876	3,538
Number of clusters	282	238	235	282	238	235	282	238	235
H_0: Weak instruments (p-value)	0.118	0.017	0.006	0.118	0.017	0.006	0.118	0.017	0.006

Table VII:
Household Consumption, Minimum Wage Income Shock and Liquidity Constraints

We report 2SLS level regressions in which real annual household consumption is regressed on the household's fitted annual real labor and transfer income and on additional interaction terms identifying liquidity constrained households. The interaction terms are property income dummy in Columns (1)-(3), a capital income dummy for interest, dividends and insurance income in Columns (4)-(6), and a dummy for (debt-free) house ownership in Columns (7)-(9). The samples consist of all households for which the labor income share S from wages near the minimum wage represent a strictly positive share ($S > 0$), more than 25% ($S > 0.25$), or more than 50% ($S > 0.5$), or more than 75% ($S > 0.75$) of household labor income. All regressions include city level controls, household fixed effects, interacted province-year fixed effects, and county time-trends as specified in Equation (8). We report standard errors clustered at county level in parentheses. The p-values in the last line refer to a test under the null of weak instruments (Kleibergen and Paap, 2006).

Dep. variables:	Household Consumption								
MW dependency	$S > 0.25$	$S > 0.5$	$S > 0.75$	$S > 0.25$	$S > 0.5$	$S > 0.75$	$S > 0.25$	$S > 0.5$	$S > 0.75$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Fitted labor and transfer income	1.273	1.042	1.012	1.161	0.876	0.921	1.242	1.137	1.135
	(0.658)	(0.345)	(0.337)	(0.545)	(0.398)	(0.380)	(0.566)	(0.444)	(0.428)
Fitted labor and transfer income × Property income dummy	−0.062	−0.325	−0.301						
	(0.134)	(0.164)	(0.177)						
Fitted labor and transfer income × Capital income dummy				−0.042	−0.091	−0.100			
				(0.040)	(0.065)	(0.070)			
Fitted labor and transfer income × House owner dummy							−0.014	−0.075	−0.121
							(0.081)	(0.149)	(0.148)
City-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,031	4,270	3,903	14,031	4,270	3,903	14,031	4,270	3,903
Number of clusters	474	336	328	474	336	328	474	336	328
H_0: Weak instruments (p-value)	0.176	0.005	0.002	0.147	0.008	0.004	0.139	0.009	0.004

Table VIII:
Household Consumption and Household Structure

We report 2SLS level regressions in which real annual household consumption is regressed on the household's fitted annual real labor and transfer income and on additional interaction terms identifying household structure. The interaction terms are a dummy for one or more children in the household in Columns (1)-(3), an additional dummy for one or more male children in the household in Columns (4)-(6), or an additional dummy for one or more male children older than 24 years in Columns (7)-(9). The samples consist of all households for which the labor income share S from wages near the minimum wage represent a strictly positive share ($S > 0$), more than 25% ($S > 0.25$), or more than 50% ($S > 0.5$), or more than 75% ($S > 0.75$) of household labor income. All regressions include city level controls, household fixed effects, interacted province-year fixed effects, and county time-trends as specified in Equation (8). We report standard errors clustered at county level in parentheses, two-way clustered at county and city-year level in brackets and two-way clustered at county and province-year level in curly brackets. The p-values in the last line refer to a test under the null of weak instruments (Kleibergen and Paap, 2006).

Dep. variables:	Household Consumption								
MW dependency:	$S > 0.25$	$S > 0.5$	$S > 0.75$	$S > 0.25$	$S > 0.5$	$S > 0.75$	$S > 0.25$	$S > 0.5$	$S > 0.75$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Fitted labor and transfer income	0.997	0.391	0.313	0.960	0.414	0.340	0.998	0.357	0.269
	(0.472)	(0.448)	(0.420)	(0.433)	(0.447)	(0.425)	(0.473)	(0.439)	(0.408)
Fitted labor and transfer income × Dummy children	0.258	0.702	0.756	0.219	0.728	0.792	0.260	0.664	0.723
	(0.181)	(0.307)	(0.277)	(0.183)	(0.353)	(0.321)	(0.184)	(0.300)	(0.266)
Fitted labor and transfer income × Dummy male child				0.054	−0.044	−0.057			
				(0.101)	(0.123)	(0.130)			
Fitted labor and transfer income × Dummy adult male child							−0.006	0.106	0.107
							(0.102)	(0.133)	(0.144)
City level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,031	4,270	3,903	14,031	4,270	3,903	14,031	4,270	3,903
Number of clusters	474	336	328	474	336	328	474	336	328
H_0: Weak instruments (p-value)	0.144	0.005	0.002	0.137	0.004	0.001	0.142	0.006	0.002

Table IX:
Parallel Trends and Anticipation Effects

Reduced form specifications regress the annual real household consumption in RMB on the contemporaneous real local minimum wage level and alternatively lags of one and two years in Columns (1)-(4) and leads of one and two years in Columns (5)-(8). The samples consist of all households for which the labor income share S from wages near the minimum wage represent a strictly positive share ($S > 0$), more than 25% ($S > 0.25$), or more than 50% ($S > 0.5$), or more than 75% ($S > 0.75$) of household labor income. All regressions include household, county and interacted province-year fixed effects. We control for all other type of income including transfers, we add city level controls, and county time trends as specified in Equation (9). We report standard errors clustered at county level in parentheses, two-way clustered at county and city-year level in brackets and two-way clustered at county and province-year level in curly brackets.

Dep. variable:	Annual Real Household Consumption							
	Persistent Income Effects				Anticipated Income Effects			
MW dependency:	$S = 0$	$S > 0$	$S > 0.5$	$S > 0.75$	$S = 0$	$S > 0$	$S > 0.5$	$S > 0.75$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Minimum wage	0.989	1.459	2.349	2.523	1.002	0.991	1.398	1.663
	(0.628)	(0.619)	(0.935)	(1.071)	(0.675)	(0.684)	(0.722)	(0.812)
Minimum wage$_{t-1}$	-0.619	-0.458	-1.245	-1.212				
	(0.524)	(0.597)	(1.018)	(1.076)				
Minimum wage$_{t-2}$	-0.136	0.704	0.802	0.616				
	(0.686)	(0.689)	(1.391)	(1.443)				
Minimum wage$_{t+1}$					0.218	-0.098	-0.743	-0.785
					(0.527)	(0.461)	(0.801)	(0.849)
Minimum wage$_{t+2}$					0.034	-0.100	0.065	0.056
					(0.549)	(0.322)	(0.460)	(0.585)
HH FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,728	14,031	4,265	3,897	19,728	14,031	4,265	3,897
Number of clusters	508	474	335	327	508	474	335	327
Adjusted R-square	0.790	0.809	0.843	0.851	0.790	0.809	0.843	0.851

Appendix A: Predicting the Minimum Wage

For the correct interpretation of econometric estimates, it is important that minimum wage changes in China are non-predictable and can be considered as a random income shocks from the perspective of households. In this section we show that wage changes are indeed non-unpredictable even when using rich information sets with socio-economic and political data typically beyond the reach of individual households.

First, we use county-level socio-economic data to explore the predictability of minimum wage changes. Second, we aggregate the Urban Household Survey (UHS) data and examine whether these alternative county-level aggregates show any predictability for the minimum wage change. Third, we use biographical data on the two most important political decision makers in Chinese counties, namely the mayor and party secretary, to predict minimum wage changes. Throughout this exercise, we code any nominal minimum wage change in a county as a binary (0/1) decision. Nevertheless, all the results are robust if the (level) change of the minimum wage becomes the dependent variable or if we use the natural logarithm of the new to the old minimum wage. [27]

A.1. Predictability Based on County-Level Data

Table A-I presents OLS regression based on country-level socio-economic data to examine the predictability of minimum wage changes codes as binary outcomes (0/1). The socio-economic data are sourced from the Prefecture Statistical Annual Yearbooks, the Fiscal Statistics for Prefectures, Municipalities and Counties and the National Demographic Yearbook. We note that these county level data have an imperfect overlap with the sample of counties in our main data and so we do not use them in the analysis on household consumption. Yet they are still a useful data source for a test of predictability of the minimum wage change.

Columns (1)-(3) include the listed covariates as contemporaneous changes and Columns (4)-(6) as lagged changes. All variables are expressed in real terms using a province-level consumer price deflator. We find that none of the county variables robustly predicts (either as contemporaneous or lagged changes) minimum wage across specifications. In Column (3) only the average salary in the county shows weak negative relation with the decision to change the minimum wage. But this marginal significance disappears when we use two-way clustering at the county and province-year levels (not shown). Overall, we conclude that the results indicate no systematic relationship between county-level socio-economic variables and minimum wage changes.

A.2. Predictability Based on Aggregates of Household Survey Data

Table A-II explores the predictability of minimum wage changes based on county-level aggregates of the Urban Household Survey (UHS) used throughout the paper. The set of counties covered differs from Table A-I and the time span is restricted to the period 2002-2009. The county-level aggregates of the UHS data are complimented by city-level variables drawn from the China City Statistical Yearbooks in the Chinese Statistical Yearbook Database (CNKI). Again, no statistically significant relationship appears between the various covariates and the minimum wage change. The results also holds if we consider level change in minimum wages as an alternative dependent variable.

[27] These results are available from the authors upon request.

A.3. Predictability Based on Biographical Data of Local Political Leaders

In democratic societies, important political decisions like minimum wage changes are subject to open political debate and depend on the parliamentary strength of competing political parties. Chinese politics represents an entirely different political setting, important policy issues can be contingent on the preferences of the key local decision makers, Yao and Zhang (2015). Minimum wage changes in China originate in an administrative and political process that is not subject to an open debate that involves the public at large. This implies that little public information is generated that would allow households to anticipate minimum wage changes. Moreover, the law only stipulates the requirement of regular review, not a mandatory change. While individual policy preferences are hard to observe, such preferences and policy outcomes could nevertheless be related to personal political career paths and curricula or to demographic characteristics of local leaders.

The two main political actors in Chinese local politics are the mayor, appointed by the local communist party assembly, and the local party secretary, appointed by personal office of the central party administration. Their biographical data are available in the Chinese Bureaucracies and Leaders Database, which is constructed and maintained by the National Chengchi University.[28] We use biographical information about their respective tenure, their first year in office, the their year of promotion and retirement, as well as their age and experience. Table A-III presents the regression results with seven biographical variables for the local party secretary and an equal number for the local mayor. Yet none of these biographical variables has any predictive value for minimum wage change. Similar results are obtained if we define the dependent variable as first difference in minimum wage levels.

Overall, we conclude from Tables A-I, A-II and A-III that minimum wage changes in China are not predictable based on county-level socio-economic data or even biographical data on the two most powerful local politicians.

[28] See http://ics.nccu.edu.tw/chinaleaders/. The data are documented in Shih et al. (2010), Yao and Zhang (2015) and Zhou (2016).

Table A-I: County-Level Determinants of Minimum Wage Changes, 1997-2010

The minimum wage change as the dependent variable is coded as a binary decision outcome (1/0) with 1 representing a change and regressed on various county-level socio-economic variables. Columns (1)-(3) use covariates in first differences contemporaneous with the minimum wage change; Columns (4)-(6) use covariates in first differences lagged by one year relative to the minimum wage change.

Dep. variable:	Minimum wage change dummy (1/0)					
	Covariates in Δ_t			Covariates in Δ_{t-1}		
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(County Real GDP)	-0.042	-0.191	-0.005	-0.076	-0.097	-0.012
	(0.035)	(0.045)	(0.010)	(0.028)	(0.049)	(0.009)
Ln(County Population)	-0.077	-0.240	0.005	0.165	0.176	0.012
	(0.103)	(0.128)	(0.009)	(0.101)	(0.153)	(0.010)
Ln(County Total Employment)	-0.014	-0.011	-0.001	0.004	0.007	-0.000
	(0.014)	(0.016)	(0.001)	(0.016)	(0.023)	(0.001)
County Government Balance/GDP	-0.001	-0.001	-0.000	-0.000	-0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)
Ln(County Salary per capita)	0.016	0.002	-0.020	0.021	0.006	0.002
	(0.013)	(0.013)	(0.011)	(0.007)	(0.007)	(0.001)
Ln(County Employment in Agriculture)	-0.021	-0.016	0.000	0.026	0.030	0.001
	(0.009)	(0.010)	(0.001)	(0.009)	(0.012)	(0.001)
Ln(Real County Savings)	-0.002	-0.007	-0.002	0.014	0.005	0.001
	(0.015)	(0.016)	(0.002)	(0.013)	(0.019)	(0.001)
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes			Yes		
County Trend		Yes	Yes		Yes	Yes
Province-year FE			Yes			Yes
Observations	8716	8716	8714	7139	7139	7137
Number of clusters	1651	1651	1651	1647	1647	1647
Adjusted R-square	0.591	0.697	0.990	0.625	0.686	0.992

Table A-II: Constructed County-Level Determinants of Minimum Wage Changes, 2002-2009

The minimum wage change as the dependent variable is coded as a binary decision outcome (1/0). We construct county-level aggregates from the UHS data and add city level variables. Columns (1)-(2) present estimates with standard errors clustered at the county level; Columns (3)-(4) report standard errors clustered two ways at the county and province-year level.

Dep. variable:	Minimum wage change dummy (0/1)			
Standard error clustering:	County		Two-way	
	(1)	(2)	(3)	(4)
County-level variables				
Δ_t Ln(County HH real consumption)	-0.008	0.047	-0.008	0.047
	(0.108)	(0.055)	(0.111)	(0.059)
Δ_t Ln(County HH tot. expend.)	0.001	-0.028	0.001	-0.028
	(0.092)	(0.039)	(0.105)	(0.451)
Δ_t Ln(County HH savings)	-0.002	-0.006	-0.002	-0.006
	(0.019)	(0.008)	(0.018)	(1.265)
Share of county SOE workers	-0.183	0.089	-0.183	0.089
	(0.148)	(0.069)	(0.177)	(2.248)
City-level variables				
Δ_t Ln(City real GDP)	0.484	0.070	0.484	0.070
	(0.211)	(0.111)	(0.450)	(0.753)
Δ_t Ln(City population)	-0.130	0.090	-0.130	0.090
	(0.084)	(0.068)	(0.144)	(1.214)
Δ_t City unemployment rate	0.208	-0.065	0.208	-0.065
	(0.273)	(0.148)	(0.335)	(1.511)
Δ_t Ln(Total city employment)	0.167	-0.130	0.167	-0.130
	(0.199)	(0.133)	(0.330)	(0.507)
Δ_t City employment/population	-0.624	0.357	-0.624	0.357
	(1.121)	(1.166)	(1.578)	(1.486)
County FE	Yes	Yes	Yes	Yes
Year FE	Yes		Yes	
County trends		Yes		Yes
Province-year FE		Yes		Yes
Observations	1602	1602	1602	1602
Number of clusters	591	591	99	99
Adjusted R-squared	0.353	0.973	0.676	0.973

Table A-III: Political Characteristics and Minimum Wage Changes, 1997-2010

The minimum wage change as the dependent variable is coded as a binary decision outcome (1/0) with 1 representing a change and regressed on the characteristics of the local party secretary and the mayor. Columns (1)-(2) present estimates with standard errors clustered at the county level; Columns (3)-(4) report standard errors clustered two ways at the county and province-year level.

Dep. variable:	Minimum wage change dummy (1/0)			
Standard error clustering	County		Two–way	
	(1)	(2)	(3)	(4)
Party secretary characteristics:				
First year in office dummy	0.018	0.004	0.018	0.004
	(0.009)	(0.004)	(0.009)	(0.004)
Promotion year dummy	0.049	-0.005	0.049	-0.005
	(0.026)	(0.007)	(0.026)	(0.010)
Retirement year dummy	0.079	0.028	0.079	0.028
	(0.034)	(0.013)	(0.034)	(0.017)
Age	0.047	0.018	0.047	0.018
	(0.057)	(0.016)	(0.055)	(0.028)
Age^2	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.000)	(0.001)	(0.000)
Province experience dummy	-0.016	0.005	-0.016	0.005
	(0.030)	(0.009)	(0.030)	(0.009)
City tenure length (years)	0.007	0.004	0.007	0.004
	(0.007)	(0.003)	(0.007)	(0.003)
Mayor characteristics:				
First year in office dummy	0.090	-0.008	0.090	-0.008
	(0.091)	(0.026)	(0.085)	(0.026)
Promotion year dummy	0.030	-0.001	0.030	-0.001
	(0.023)	(0.005)	(0.025)	(0.007)
Retirement year dummy	-0.016	-0.001	-0.016	-0.001
	(0.043)	(0.013)	(0.043)	(0.018)
Age	-0.003	0.006	-0.003	0.006
	(0.052)	(0.017)	(0.063)	(0.018)
Age^2	0.000	-0.000	0.000	-0.000
	(0.001)	(0.000)	(0.001)	(0.000)
Province experience dummy	0.024	0.003	0.024	0.003
	(0.023)	(0.006)	(0.026)	(0.008)
City tenure length (years)	0.090	-0.007	0.090	-0.007
	(0.091)	(0.025)	(0.084)	(0.025)
County FE	Yes	Yes	Yes	Yes
Year FE	Yes		Yes	
County Trend		Yes		Yes
Province-year FE		Yes		Yes
Observations	14548	14544	14548	14544
Number of clusters	258	257	232	228
Adjusted R-square	0.383	0.964	0.383	0.964

Appendix B: Sample Construction

B.1. Household Data Selection

China's Urban Household Survey (UHS) has two components. At the household level, we dispose of data on various consumption items and household income. At the level of household members, additional data captures household member income, income type, employment status, years of education, years of work experience, etc. We merge the household survey data with the minimum wage data at county and city level from the Chinese Ministry of Human Resources and add additional macroeconomic variables at the county and city level. All monetary variables are converted in real terms using the province-level urban CPI index with the base year 2002. The raw data constitutes a panel of 201,795 household-year observations and 773,330 household-member-year cells for the period 2002-2009. The following data filters are applied to the household data:

1. We only retain households that are observed at least twice in the panel (i.e. we drop 68,779 household-year observations).

2. We retain only households reporting in their first year of sampling at least two wage earning household members (i.e. we drop 59,624 household-year observations). Wage-earning household members are those who are potentially affected by minimum wage changes.

3. We eliminate households that provide contradictory information about the household head and for which we cannot compute the share S (228 household-year observations).

The final data set comprises 73,164 household-year observations. Descriptive statistics of the main variables and household demographics are shown in Tables A-IV and A-V respectively.

B.2. Identifying the Two Highest Wage Earners within the Household

For minimum wages changes to matter for household income, a household needs to earn a positive share of its total household income from labor income near or at the minimum wage. Within each household, we identify the two highest wage earners conditioning on the first year the individual is observed in the panel. The selection of wage earners within each household follows these principles:

1. We ignore self-employed individuals (30,971 member-year observations); retired household members (124,901); retired and then re-employed household members (11,396), incapacitated persons (8,396), homeworkers (61,343), soldiers, social volunteers or part-time employed workers (17,879), students (56,737) and other household members undergoing training (251).

2. We ignore household members outside the labor force: below 16 years of age (75,317) and above 59 for males (2,566) and above 54 for females (2,363).

3. We ignore household members with inconsistent records where they are reported as unemployed and nevertheless receive a positive labor income (6363).

4. We ignore members with incomplete reporting on labor income (6,694) and workers with an annual real wage lower than 50% of the annual real minimum wage (12,293).

5. We ignore workers with abnormally high increases in their real wage (above 1000%) between the first and last year of observation in the panel (187).

6. We ignore household members with inconsistent age records that increase by more than one from one year to another or decrease (6,553) and household members who are not relatives (210).

The two highest wage earners within the household are in most cases (80.5%) the head of the household and the spouse. We retain for the household-level regressions their wage income, age, gender, level of education and years of work experience, years since migration to the city, marital status, industry and occupation.

B.3. Minimum Wage Dependency of a Household

Finally, we define the share S of household income coming from the wage income (of the two highest wage earners) at or near the minimum wage. We consider a wage earner to earn a minimum wage if her salary ranges between 50% and 150% of the real minimum wage of their county of residence in the first year the individual is observed in the panel. Conditioning on the first year of household observation assures that the treated household group remains unchanged over time.

Among the two highest wage earners of all retained households, we identify 32,580 (18.72%) treated (minimum wage) and 141,442 (81.28 percent) non-treated worker-year observations. We also undertake extensive robustness checks with respect to a narrower salary range from 50% to 120% of the local minimum wage, which results in 18,721 (10.76%) and 155,301 (89.24%) non-treated worker-year observations, respectively.

Table A-IV reports summary statistics on the households income and expenditure components for household groups sorted by their minimum wage income share S. Column (1) includes all households, Column (2) with $S = 0$ all households without wage income at or near the minimum wage, whereas Columns (3)-(5) feature household groups of increasing minimum wage dependency.

Table A-IV: Incomes and Expenditures Share of Disposable Income

The table summarize the household income and expenditure components as a share of disposable income by different household types sorted by their share S of minimum wage income in total household income. Data are from the Urban Household Survey (UHS) and cover the period from 2002 to 2009. Reported are average values for the entire period and standard errors are in parentheses below.

MW dependency:	All Households	S=0	S>0	S>0.5	S>0.75
INCOME COMPONENTS:					
Labor income	0.902	0.917	0.862	0.779	0.792
	(0.158)	(0.140)	(0.192)	(0.243)	(0.242)
Transfer income	0.083	0.069	0.120	0.195	0.185
	(0.146)	(0.128)	(0.181)	(0.234)	(0.233)
Transfer income net of pension	0.041	0.035	0.055	0.082	0.068
	(0.081)	(0.071)	(0.100)	(0.124)	(0.106)
EXPENDITURE COMPONENTS:					
Consumption	0.724	0.705	0.773	0.820	0.817
	(0.311)	(0.310)	(0.308)	(0.359)	(0.364)
Housing expenditure	0.055	0.060	0.040	0.035	0.031
	(0.491)	(0.502)	(0.458)	(0.441)	(0.420)
Education expenditure	0.112	0.112	0.111	0.103	0.102
	(0.125)	(0.119)	(0.139)	(0.154)	(0.155)
Health expenditure	0.043	0.041	0.048	0.054	0.053
	(0.084)	(0.075)	(0.105)	(0.116)	(0.117)
Durables expenditure	0.039	0.041	0.036	0.032	0.032
	(0.060)	(0.063)	(0.051)	(0.042)	(0.042)
Savings	0.240	0.264	0.179	0.143	0.146
	(0.309)	(0.324)	(0.254)	(0.228)	(0.232)
Observations	73164	53054	20110	4365	3990
Share of observations in sample		0.72	0.27	0.06	0.05
Share of total labor income		0.819	0.181	0.026	0.024

Table A-V: Household Demographics

The table summarize the household demographics by household type sorted on the share S of minimum wage earnings in total household income. Data are from the Urban Household Survey (UHS) and cover the period 2002-2009. Reported are average values for the entire period and standard errors are in parentheses below. Household head refers to the household member with the highest labor income; SOE stands for State Owned Enterprise; education is a categorical variable with a total of nine categories: no schooling, basic literacy classes, primary school, junior high school, senior middle school, secondary, college enrolment, bachelor completed, graduated.

MW dependency:	All Households	S=0	S>0	S>0.5	S>0.75
Household size	3.145	3.118	3.215	3.345	3.355
	(0.724)	(0.703)	(0.773)	(0.862)	(0.869)
House ownership	0.870	0.890	0.818	0.778	0.776
	(0.336)	(0.313)	(0.386)	(0.415)	(0.417)
Years since migrating	8.047	8.429	7.040	6.047	6.149
	(11.10)	(11.15)	(10.91)	(10.63)	(10.69)
SOE employee share	0.735	0.778	0.620	0.436	0.441
	(0.441)	(0.415)	(0.485)	(0.496)	(0.497)
Female Head	0.270	0.292	0.211	0.318	0.316
	(0.444)	(0.455)	(0.408)	(0.466)	(0.465)
Age of the household head	41.38	41.29	41.62	40.58	40.47
	(7.842)	(7.742)	(8.095)	(8.686)	(8.754)
household head education	5.914	6.127	5.351	4.929	4.941
	(1.441)	(1.419)	(1.345)	(1.172)	(1.174)
Head work experience (years)	20.87	20.84	20.95	19.35	19.23
	(8.703)	(8.590)	(8.995)	(9.804)	(9.859)
Observations	73164	53054	20110	4365	3990

Appendix C: Specification Issues: county trends and province-year fixed effects

Table A-VI: Alternative First-Stage Regressions

Household annual real labor income is regressed on the annual real minimum wage for households sorted by the share S of household minimum wage income in total income under two alternative specifications. Columns (1)-(4) do not include linear county time trends and province-year fixed effects in the specification, while Columns (5)-(8) control for linear county time trends and province-year fixed effects. We report standard errors clustered at county level in parentheses, two way clustered errors at county and city-year level in brackets and two-way clustered errors at county and province-year level in curly brackets. All regressions include controls for the two highest labor income earners in the household, namely age and age squared, a gender dummy, years of work experience and work experience squared, years since migration to the city and squared, household size as measured by the number of household members and a house ownership dummy. Additional categorical control variables characterize the level of education, marital status, industry and occupation. City-level variation is accounted for by city population, city real GDP, city real average wage and city unemployment rate.

Dep. variable:	Household Real Labor Income							
	Household FE and year FE				County trends and province-year FE			
MW dependency:	$S=0$	$S>0$	$S>0.5$	$S>0.75$	$S=0$	$S>0$	$S>0.5$	$S>0.75$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Real Minimum Wage (in RMB)	1.222	1.832	2.161	1.976	0.012	0.507	1.378	1.563
	(0.296)	(0.388)	(0.562)	(0.568)	(0.524)	(0.473)	(0.636)	(0.743)
	[0.316]	[0.547]	[0.618]	[0.639]	[0.521]	[0.497]	[0.660]	[0.771]
	{0.386}	{0.526}	{0.829}	{0.833}	{0.570}	{0.496}	{0.750}	{0.878}
Observations	51,330	19,728	4,270	3,903	51,330	19,728	4,267	3899
Number of clusters	600	508	336	328	600	508	336	328
Adjusted R-square	0.925	0.861	0.820	0.821	0.930	0.883	0.889	0.889
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes				
County trends					Yes	Yes	Yes	Yes
Province-year FE					Yes	Yes	Yes	Yes

Appendix D: OLS Estimates: Income Elasticity of Consumption

Table A-VII: OLS Estimates: Income Elasticity of Consumption

We report OLS regressions, where Columns (1)-(4) estimate the income elasticity of consumption using household real labor income as the main regressor of interest, whereas Columns (5)-(6) use the sum of labor and transfer incomes as the main regressor of interest. We report standard errors clustered at county level in parentheses, two-way clustered errors at the county and city-year level in brackets, and two way clustered errors at the county and province-year level in curly brackets. All regressions include controls for the two highest labor income earners in the household, namely age and age squared, a gender dummy, years of work experience and work experience squared, years since migration to the city and squared, household size as measured by the number of household members and a house ownership dummy. Additional categorical control variables characterize the level of education, marital status, industry and occupation. City-level variation is accounted for by city population, city real GDP, city real average wage and city unemployment rate.

Dep. variable:	Annual Real Household Consumption							
MW dependency:	$S = 0$	$S > 0$	$S > 0.5$	$S > 0.75$	$S = 0$	$S > 0$	$S > 0.5$	$S > 0.75$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Household real labor income	0.398	0.439	0.405	0.387				
	(0.039)	(0.020)	(0.082)	(0.081)				
	[0.040]	[0.020]	[0.083]	[0.081]				
	{0.041}	{0.025}	{0.089}	{0.088}				
Household real labor and transfer income					0.388	0.437	0.359	0.334
					(0.031)	(0.023)	(0.076)	(0.079)
					[0.031]	[0.024]	[0.077]	[0.080]
					{0.032}	{0.025}	{0.077}	{0.081}
Observations	19,728	14,031	4,267	3,899	19,728	14,031	4,267	3,899
Number of clusters	508	474	336	328	508	474	336	328
Adjusted R-square	0.809	0.836	0.862	0.868	0.812	0.838	0.868	0.876
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes