Minimum Wages and Unemployment: Evidence from Russia

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Abstract: The impact of minimum wages on employment has been widely explored in many countries, however, little attention is paid to Russian labor market. In this paper we use the regional panel data 2009-2012 to study the impact of minimum wages on unemployment and informality in Russia. By exploiting a novel instrumental variable for regional minimum wages, that is regional Winter Severity Index which is also known as Bodman Index, we find that a higher minimum wage has no causal impact on the overall unemployment rate, but increases the informality. We further conduct analysis for different subgroups and find that a higher minimum wage increases unemployment rate of young workers (aged 15-19 and 20-29) or those without tertiary education, but has no significant impact on adult workers (aged 30+) or those with tertiary education. Our results are robust to alternative model specifications.

Keywords: minimum wage; unemployment; informality; Bodman Index; Russia

JEL: J3; J6

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1. Introduction

Minimum wage policies indeed remain one of the most controversial issues among academia and policy makers. Proponents of minimum wages hikes highlight that such policies can be used as a tool to reduce inequality by shrinking the bottom tail of a state's income distribution (Almeida and Terrell, 2008). However, opponents argue that wage rigidity, or, in other words, the failure of wages to adjust to a level at which labor supply interacts with labor demand, is a cause of a disemployment effect of such policies and hence they harm, rather than protect the state's labor market stability.

The earlier generations of studies tend to rely on time-series techniques and show an adverse effect of minimum wages' raises on teenagers and non-whites (Adams, 1987; Brown, Gilroy and Cohen, 1982). Further researches relied predominantly on survey-based longitudinal and/or cross-sectional micro data and demonstrated contradictory evidences of disemployment effects: in some cases the estimated employment elasticities were either statistically insignificant, or even positive (Card and Krueger, 1994; Neumark and Wascher, 1994, 2004).

As in the case of the US labor market, evidences of minimum wage's impact on unemployment in other developed countries are mixed. Swidinsky (1980) claims that the estimated negative elasticity of teenage employment (defined as the most vulnerable segment of labor force) with respect to the minimum wages in Canada is sufficiently low. Thus, Swidinsky assures that the state's economic costs of a moderate increase in the minimum wage distribution would not be unduly severe. Similar results have been observed in the Spanish labor market, where higher employment in all industries was associated with higher minimum wages, while a totally opposite effect was peculiar to young workers (Garcia, Goerlich and Orts, 1994).

Most of the evidences from developed countries converge on the following point: minimum wages hikes lead to substitution of skilled labor for the most vulnerable (low-skilled and low-productive) labor segments (mostly presented by teenagers) with low marginal productivity.

A large fraction of the labor force in developing countries remains outside the regulatory framework, being employed in the informal economy with low income, low job security and no social protection (Bachetta, Ernst and Bustamante, 2009). For example, the empirical evidence from the Indonesian market, where informal employment accounts for almost 70% of urban employment, shows that raises in state's minimum wages' level do lead to job losses (Comola and Mello, 2011). However, an interesting finding is that it doesn't result in higher overall state's unemployment and even increases a net increase in

total (formal and informal) employment, since job losses in the formal sector are offset by job gains in informality.

Harris and Todaro (1970) presented a general equilibrium model of dual economy, explaining some issues regarding rural-urban migration. One aspect of the model, which is minimum wages set institutionally in the urban, had been ignored by most of economists, however. Paranos (2005) has given a very detailed discussion of the effects of minimum wages on sectoral unemployment based on original Harris-Todaro model. They claim that if the elasticity of demand for labor with respect to minimum wages' level is lower than one, then, employment in the urban and rural sectors will fall and urban unemployment will be increased. This change may be grounded by simple logical explanation: displaced workers either shift to the rural (informal) sector, as it has been demonstrated by Comola and Mello (2011), since the probability of finding job in urban area goes down, or stay in the urban sector "queuing" for a formal-sector job.

Similar impacts of minimum wages' increase may be observed in the Russian labor market where a significant evidence of its adverse effect has been found. More precisely, higher minimum wages were found to yield an increased youth unemployment and informality (Muravyev and Oschepkov, 2013).

One should be careful in equalizing such impacts as "job losses" and "increased unemployment" in an attempt to study the labor market with high informality, since the "transition effect" draws a clear distinction between these terms (although they might be synonyms in developed countries). No negative impact of minimum wages' hikes on a state employment doesn't imply no disemployment effect, since displaced workers might simply shift to the informal sector and hence "hide" the magnitude of a minimum wages' impact on a state's job losses.

For the rest of the developing countries the literature on how minimum wages affect employment and informality are rather limited and hence more research are necessary for better comprehension of this issue. In this research we aim to contribute to this strand of literature using Russian data. We use the regional panel data 2009-2012 to study the impact of minimum wages on unemployment and informality in Russia. By exploiting a novel instrumental variable for regional minimum wages, that is regional Winter Severity Index which is also known as Bodman Index, we find that a higher minimum wage has no causal impact on the overall unemployment rate, but increases the informality. We further conduct analysis for different subgroups and find that a higher minimum wage increases unemployment rate of young workers (aged 15-19 and 20-29) or those without tertiary education, but has no significant impact on adult workers (aged 30+) or those with tertiary education. Our results are robust to alternative model specifications.

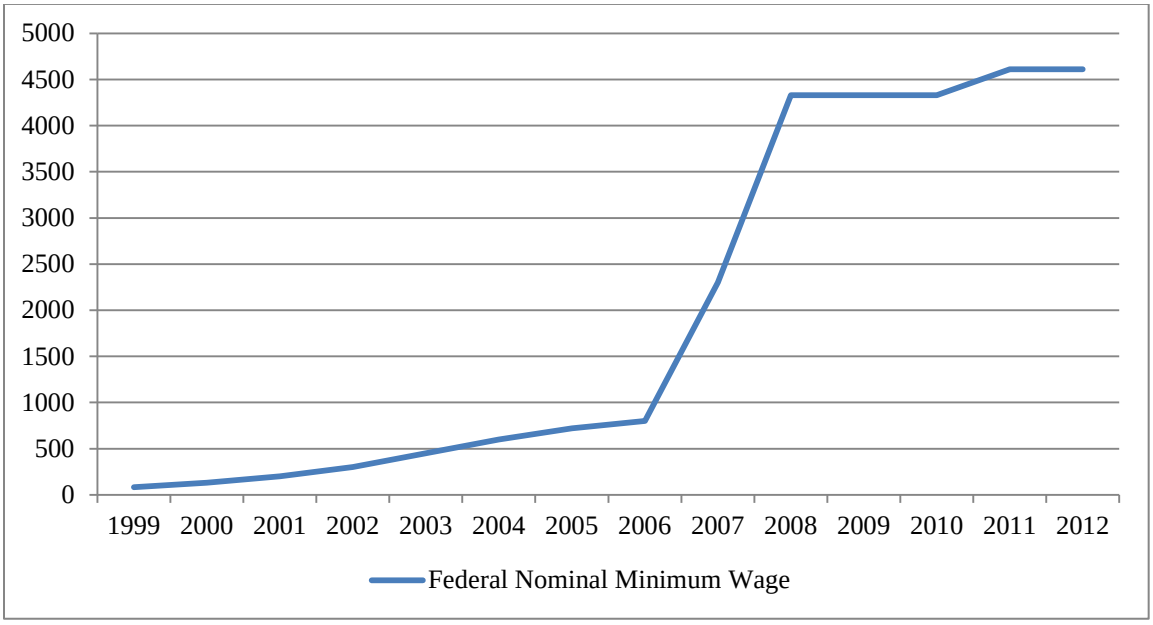
The rest of this paper is organized as follows. Section 2 discusses data and empirical methodology. Section 3 reports the main results. Section 4 conducts robustness checks. Section 5 concludes.

2. Data and Methodology

The term “minimum wage” in Russia implies a statutory minimum wages being used for determining salaries, unemployment benefits, taxes, premiums and other dues. Russian legislative system obliges employers to pay minimum wages to all full-time workers, regardless of age, sex or industry unless employees work part-time (less than 40 hours per week).

The country has State minimum wage being regulated by relevant Federal Law, while since 2007 Federal Subjects (i.e. States) are allowed to establish their own level of minimum wages that must not exceed the nationwide one. Thus, in some Federal Subjects nominal minimum wages may exceed the federal. The figure below shows the dynamics of federal nominal minimum wages.

Figure 1. Dynamics of nominal Federal Minimum Wage, 1999-2012.



Source: Federal law on the minimum wages of The Russian Federation

Our sample covers 80 out of the 83 Federal Subjects from 2009 to 2012. The key data source of the main regional macro indicators is Russian Federal State Statistics service and national Labor Force Survey. No cumulative dataset on regional minimum wages exists, however. Hence, we collect the data from respective Federal Laws and Labor

Unions' agreements that establish regional minimum wages.

We consider the following equation, based on a standard neoclassical model of unemployment as a function of minimum wages and inflation:

$$un_{it} = \beta_0 + \beta_1 lnMW_{it} + \beta_2 Inflation_{it} + X'_{it}\gamma + \tau_i + \theta_t + u_{it} \quad (1)$$

where un_{it} denotes unemployment rate, MW_{it} is real minimum wage (in 2008 prices), $Inflation_{it}$ is the regional inflation rate, X_{it} denotes a vector of regional-level covariates, τ_i is unobserved time-invariant covariate, θ_t denotes time effect, and ε_{it} is the error term.

Researches may use different minimum wage variables to identify their causal effect on unemployment. For example, one of the most popular variables, which also grounded the most recent study of Russian labor market (Muravyev and Oschepkov, 2013), is so-called Kaitz index, defined as a minimum wage over mean wages ratio adjusted for coverage (Kaitz, 1970). This ratio has its pros and cons, however. While, to certain extent, it does make sense to attribute different labor market outcomes to this ratio (that has a greater variation by its definition), the one should clearly understand, that an estimated elasticity is also being driven by the denominator of Kaitz index (regional mean wages). Keeping in mind the existence of other minimum wage variables (fraction affected, fraction at, fraction below and so forth), it's almost impossible to compare the results of different studies. Thus we use the real minimum wages in our study. To deal with the potential endogeneity of minimum wages, we employ an instrumental variables approach.

The main instrument we use is winter severity, measured by Bodman index. The main reason is that the winter severity may affect the level of minimum wages, while has no direct impact on unemployment rate. Reviewing Russian labor market from the historical prospective, one may notice that in some regions, though unemployment rates were high, minimum wages were kept higher than federal floor. This phenomenon is explained by the existence of so-called Northern Multiplier: in the North and Far East, where the winter is much colder than in other regions, workers were paid higher minimum wages regardless of the labor market's condition. This was, according to the Labor Code of the Russian Federation, one of the forms of social benefits for workers living in regions with tough northern climate. The computation of minimum wages in federal subjects where Northern Multiplier existed, was straightforward:

Regional MW = Federal MW x Northern Multiplier,

where Northern Multiplier (depending on the closeness to the North) was varying from 1.1 to 2. For example, in 2006, while federal minimum wage was 1100, the workers in Chukotsky Autonomous Okrug (where Northern Multiplies was 2) were receiving 2200,

although local unemployment rate was up to 3 higher than in regions that had no Northern Multiplier and hence kept wages equal to federal level.

Although the Northern Multiplier did explain the variation of minimum wages across regions, it may not be considered as a good instrument. First, the Northern Multiplier is a time-invariant index that would have been eliminated by fixed-effect regression. Second, the concept of Northern Multiplier existed only until the middle of 2007 and hence is not able to explain the variation of minimum wages in subsequent years. Finally, the value of different indices across the regions is not purely exogenous and therefore doesn't satisfy the assumption of exclusion restriction. After 2007, however, some regions did keep regional minimum wages higher than federal despite the unemployment rates. Coincidently, most of those federal subjects, where Northern Multiplier existed, remained to be unrestricted by federal minimum wages, which pushes towards the following question: what determines the variation of minimum wages in those regions?

Lemos (2004) used political variables as instruments for endogenous minimum wages. The primary strategy was the following: first, the data on votes in favor and against minimum wages' hikes were collected under assumption that larger number of politicians standing for workers' rights increases the likeliness of establishment a higher wages' level; second, the election data was collected following Sobel's (1999) observation, that historically minimum wages, being a tool of political propaganda, have been increasing few days before the elections over the entire history of US, starting from the establishment of Fair Labor Standards Act.

In line with the evidence given above, we assume that the likelihood of enactment higher minimum wages is determined by political power of labor union bargaining for them in a particular federal subject in the Russian Federation. If this assumption is correct, then, regional policy makers are likely to observe the labor market outcomes of minimum wages' increases in the past. If past unemployment were hold at the acceptable level, then, regional policy makers would be more likely to agree to push minimum wage above federal standards.

Political power of labor union is just one part of the story, however, since a good argument for minimum wages' increase should be provided for the sake of reaching the agreement with regional politicians. Keeping in mind the concept of Northern Multiplier, it is logically to assume, that labor unions, being representatives or workers' rights, may consider a winter severity as an argument for pushing wages up for the sake of improving living conditions of low-income population. If the winter becomes more severe in a particular region, then labor unions obtain a stronger ground to bargain for higher minimum wages.

The most obvious measurement of winter severity is an average temperature. This measurement is not without disadvantages, however. First, the temperature itself is likely to correlate with many factors left in residual and hence may not be considered as a truly exclusive instrument. Second, it fails to take into account other factors affecting human's perception of winter severity, such as precipitation intensity, wind speed and atmospheric humidity.

One of winter severity's measurements was developed in 1910 by Swedish scientist Goesta Bodman. In his summary of the research expedition to the South Pole in 1901-1903, the researcher gave an attempt to objectively quantify the subjective human perception of winter severity, which is so-called Bodman Index:

$$S = (1 - 0.04 \times t) \times (1 + 0.27 \times v)$$

where t is the temperature (measured in °C) and is the wind speed (measured in meters per second). The higher is the value of S, the worse is the human's perception of the winter. Indeed, the equation clearly reflects Bodman's opinion: the wind is given higher weight in the formula of winter perception. If the temperature is -25 °C and the wind speed is 1 meters per second, then, the Bodman Index is equal to 2.54, while if the temperature is -8 °C and the wind speed is 17 meters per second, the Index is then equal to 7.38. This fact is explained by harmful effect of the wind expressed in ensuing breathing difficulty, mechanical pressure on the body and debilitated insulating properties of winter cloth (Bodman, 1916).

This distinguishes Bodman Index, an objective measurement of a subjective winter severity's perception, may serve as a potential instrument for minimum wage. First of all, it varies over time and, as it will be shown in subsequent chapters, does drive the variance of minimum wages across Russian regions. Second, although the temperature is a part of the formula, it does not correlate with Bodman Index across regions, since the value of the Index is mostly driven by the wind speed and hence may be totally different even in those parts of Russia, where the temperature level is identical. This, in turns, means, that Bodman Index may be considered as a truly exclusive instrument for the endogenous regressor.

In the robustness check section, we follow Neumark and Wascher (1992) to include mean of the minimum wages in geographically bordering federal subjects as another instrument. The logic behind is the following: local policy makers are likely to observe the effect of minimum wages' hikes in neighboring federal subjects' labor markets. Higher minimum wages in neighboring federal subjects are then expected to positively affect the likelihood of pushing minimum wages up in a local labor market. Minimum wages in neighboring

federal subjects, however, may be suspected to affect local labor market by attracting labor force to the regions with higher minimum wages, in which case the so-called instrument should be included as an independent variable in the unemployment equation. This suspicion, however, has no ground to be valid, since the benefits from the migration in such a big country as The Russian Federation are likely to be offset by costs of moving in other regions for the sake of earning higher minimum wage.

The data on average winter temperature and wind speed is collected from Russian Hydrometeorological Center in order to compute a Winter Severity Index, also known as Bodman Index, which is one of the instruments for Minimum Wage variable. Further discussion of the validity of the instruments would be given in further chapters.

The summary statistics of all variables are reported in Table 1.

Table 1: Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Unemployment rate (All)	332	0.080	0.042	0.008	0.433
Unemployment rate (aged 15-19)	318	0.076	0.040	0.001	0.263
Unemployment rate (aged 20-29)	316	0.060	0.034	0.015	0.334
Unemployment rate (aged 30+)	329	0.053	0.027	0.000	0.271
Unemployment rate (educ<12)	324	0.067	0.039	0.000	0.381
Unemployment rate (educ>12)	329	0.027	0.010	0.005	0.084
Informality rate	316	0.115	0.043	0.010	0.323
Real minimum wage (RUB in 2005 price)	325	4784.773	1253.873	3801.914	10907.06
Ln real minimum wage	325	8.447	0.213	8.243	9.297
Ln real GDP per capita	326	12.176	0.659	10.405	15.136
Inflation rate	332	-0.017	0.026	-0.135	0.067
Ln working population	332	13.468	0.924	10.169	15.298
Bodman index	327	4.292	1.485	1.2	8.2
Kaitz index	324	0.312	0.078	0.096	0.623
Ln mean wage in neighboring regions	331	9.736	0.370	8.847	11.034

3. Main Results

In this section we report the main regression results. Firstly we conduct Fixed-Effect regressions to eliminate the time-invariant factors. Table 2 reports the results. Columns (1) – (6) reports results for unemployment, and column (7) reports results for informality of employment. In column (1) we find that minimum wage has no significant impact on the

overall unemployment rate, though the coefficient is positive. However, we do find significant effects in columns (2), (3) and (5). Higher minimum wages do increase then unemployment rate of the younger labor force and those with lower education. The impacts on the older groups and more educated are not significant, as shown in columns (4) and (6). From column (7) we can see that an increase of minimum wage increase the informality.

Table 2: FE Regressions using Real Minimum Wage

	Unemployment rate						Informality
	All	15-19	20-29	30+	educ<12	educ>12	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ln real minimum wage	0.004	0.057***	0.055***	0.005	0.067***	-0.001	0.143***
	(0.009)	(0.014)	(0.008)	(0.007)	(0.007)	(0.004)	(0.011)
Ln real GDP per capita	-0.007	-0.007	0.006	0.005	0.001	-0.005	0.009
	(0.016)	(0.026)	(0.014)	(0.017)	(0.012)	(0.009)	(0.015)
Inflation rate	0.033	-0.016	0.032	0.002	-0.068*	0.029	0.019
	(0.033)	(0.069)	(0.035)	(0.043)	(0.034)	(0.019)	(0.033)
Ln working population	0.077	-0.070	-0.029	-0.095	-0.038	0.001	-0.031
	(0.075)	(0.087)	(0.064)	(0.137)	(0.048)	(0.029)	(0.071)
Year dummies	Y	Y	Y	Y	Y	Y	Y
Observations	321	314	312	319	316	318	312
Regions	82	80	79	82	80	82	80
Within R-squared	0.637	0.429	0.318	0.607	0.548	0.351	0.722

Notes: Standard errors in parenthesis are clustered by region. + p<0.1; * p<0.05; ** p<0.01; *** p<0.001.

Next we employ the Bodman index as the instrument for minimum wage to estimate the impacts on unemployment rate and informality. Panel A of Table 3 reports the second stage regression results, and Panel B shows the first stage results. In Panel B we find that the F statistics of the excluded instrument, Bodman Index, ranges from 62.92 to 71.25, thus it seems we do not have the weak instrument problem. In Panel A we can see that the impacts of minimum wages are very similar to those in the FE regressions reported in Table 2. One percentage point increase in the minimum wage increases the unemployment rate of those aged 15-19 and aged 20-29 by 0.046 and 0.056 percentage points respectively. The impact on those without tertiary education is 0.072 percentage point. One percentage point increase in the minimum wage increases 0.137 percentage point of informality.

Table 3: 2SLS using Real Minimum Wage

	Panel A: The Second Stage						
	Unemployment rate						Informality
	All	15-19	20-29	30+	educ<12	educ>12	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ln real minimum wage	0.003	0.046*	0.056***	0.007	0.072***	-0.004	0.137***
	(0.013)	(0.022)	(0.012)	(0.011)	(0.010)	(0.005)	(0.014)
Ln real GDP per capita	-0.007	-0.007	0.006	0.005	0.001	-0.005	0.009
	(0.015)	(0.026)	(0.013)	(0.017)	(0.012)	(0.009)	(0.015)
Inflation rate	0.033	-0.022	0.032	0.004	-0.066*	0.028	0.015
	(0.032)	(0.067)	(0.034)	(0.042)	(0.033)	(0.019)	(0.032)
Ln working population	0.077	-0.069	-0.029	-0.096	-0.038	0.001	-0.032
	(0.074)	(0.085)	(0.063)	(0.135)	(0.048)	(0.028)	(0.069)
	Panel B: The First Stage						
	Ln real minimum wage						
Bodman index	0.172***	0.174***	0.175***	0.172***	0.175***	0.170***	0.173***
	(0.021)	(0.022)	(0.022)	(0.021)	(0.022)	(0.020)	(0.021)
Controls	Y	Y	Y	Y	Y	Y	Y
Year dummies	Y	Y	Y	Y	Y	Y	Y
F-statistics of excluded instrument	69.74	62.92	63.58	69.37	63.93	71.25	65.09
Regions	82	80	79	82	80	82	80
Observations	321	314	312	319	316	318	312

Notes: Standard errors in parenthesis are clustered by region. + p<0.1; * p<0.05; ** p<0.01; *** p<0.001.

4. Robustness Checks

In this section we conduct robustness checks. We first consider one more instrument and conduct the over-identification test. The instrument is the mean of the minimum wages in geographically bordering federal subjects (Neumark and Wascher, 1992). The logic behind is the following: local policy makers are likely to observe the effect of minimum wages' hikes in neighboring federal subjects' labor markets. Higher minimum wages in neighboring federal subjects are then expected to positively affect the likelihood of pushing minimum wages up in a local labor market. Table 4 reports 2SLS regression results including both Bodman Index and Ln average wages in neighboring regions. We find consistent results with the main regressions as reported in Table 3. Moreover, we do not see evidence of over-identification, as shown by the P-value of Hansen J statistics.

Table 4: Over-identification tests

	Panel A: The Second Stage						
	Unemployment rate						Informality
	All	15-19	20-29	30+	educ<12	educ>12	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ln real minimum wage	0.002	0.044*	0.056***	0.007	0.070***	-0.002	0.140***
	(0.012)	(0.022)	(0.012)	(0.011)	(0.011)	(0.006)	(0.014)
Ln real GDP per capita	-0.005	-0.006	0.011	0.003	-0.002	-0.002	0.011
	(0.015)	(0.026)	(0.012)	(0.017)	(0.010)	(0.007)	(0.015)
Inflation rate	0.029	-0.025	0.022	0.005	-0.061*	0.024	0.013
	(0.031)	(0.067)	(0.033)	(0.041)	(0.030)	(0.018)	(0.032)
Ln working population	0.032	-0.085	-0.110*	-0.072	0.006	-0.053	-0.061
	(0.117)	(0.085)	(0.045)	(0.124)	(0.085)	(0.044)	(0.071)
	Panel B: The First Stage						
	Ln real minimum wage						
Bodman index	0.176***	0.177***	0.178***	0.176***	0.178***	0.173***	0.176***
	(0.022)	(0.023)	(0.023)	(0.022)	(0.023)	(0.021)	(0.023)
Ln average wages in neighboring regions	0.197+	0.212*	0.198+	0.198+	0.197+	0.174+	0.174+
	(0.102)	(0.043)	(0.102)	(0.102)	(0.103)	(0.098)	(0.098)
Controls	Y	Y	Y	Y	Y	Y	Y
Year dummies	Y	Y	Y	Y	Y	Y	Y
F-statistics of excluded instrument	32.71	29.87	29.86	32.55	30.01	33.46	30.64
P-value of Hansen J	0.269	0.515	0.318	0.816	0.521	0.312	0.270
Regions	82	80	79	82	80	82	80
Observations	320	313	311	318	315	317	311

Notes: Standard errors in parenthesis are clustered by region. + p<0.1; * p<0.05; ** p<0.01; *** p<0.001.

We then consider a different measure of minimum wage. As noted before, in the recent study of Russian labor market the relative variation of minimum wages or so-called Kaitz Index was used as the main regressor of the model of estimation (Muravyev and Oschepkov, 2013). The authors say that the usage of lagged value of the denominator (regional mean wages) of Kaitz Index eliminates the impact of minimum wages increase on the average wage. Thus, following Muravyev and Oschepkov (2013), Kaitz index was computed following the formula given below:

$$Kaitz_{it} = \frac{Minimum\ Wage_{it}}{Average\ Wage_{it-1}} \times 100$$

Table 5 reports the results using Kaitz Index instead of original minimum wages. We

obtain qualitatively similar results to the main regressions in Table 3.

Table 5：2SLS using Kaitz Index

	Panel A: The Second Stage						
	Unemployment rate						Informality
	All	15-19	20-29	30+	educ<12	educ>12	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Kaitz index	0.011	0.124*	0.157***	0.019	0.192***	-0.008	0.370***
	(0.035)	(0.060)	(0.031)	(0.030)	(0.032)	(0.015)	(0.042)
Ln real GDP per capita	-0.004	0.003	0.024+	0.005	0.012	-0.002	0.044*
	(0.015)	(0.028)	(0.014)	(0.017)	(0.010)	(0.008)	(0.019)
Inflation rate	0.029	-0.034	0.012	0.003	-0.076*	0.025	-0.016
	(0.031)	(0.068)	(0.035)	(0.042)	(0.032)	(0.018)	(0.040)
Ln working population	0.032	-0.073	-0.099+	-0.071	0.024	-0.053	-0.043
	(0.116)	(0.094)	(0.053)	(0.123)	(0.090)	(0.044)	(0.108)
	Panel B: The First Stage						
	Ln real minimum wage						
Bodman index	0.064***	0.064***	0.064***	0.063***	0.065***	0.063***	0.064***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Controls	Y	Y	Y	Y	Y	Y	Y
Year dummies	Y	Y	Y	Y	Y	Y	Y
F-statistics of excluded instrument	69.00	64.30	63.75	68.81	64.02	68.93	63.53
Regions	82	80	79	82	80	82	80
Observations	320	313	311	318	315	317	311

Notes: Standard errors in parenthesis are clustered by region. + p<0.1; * p<0.05; ** p<0.01; *** p<0.001.

5. Conclusions

In this study we use the regional panel data 2009-2012 in Russia to study the impact of minimum wages on unemployment and informality of employment. By exploiting a novel instrumental variable for regional minimum wages, regional Winter Severity Index which is also known as Bodman Index, we find that a higher minimum wage has no causal impact on the overall unemployment rate, but increases the informality of employment. We further conduct analysis for different subgroups of working population and find that a higher minimum wage increases unemployment rate of young workers (aged 15-19 and 20-29) or those without post-secondary education, but has no significant impact on adult workers (aged 30+) or those received post-secondary education. Our

results provide additional evidence that minimum wage policy may hurt those vulnerable groups.

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