Impacts of the Minimum Wage Policy on Wage Level and Wage Inequality in Mexico

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Abstract

This paper analyses the role of a Minimum Wage (MW) intervention introduced in 2012 in Mexico on wage distribution and wage inequality. The study uses cross-sectional data from 2010 to 2015 to estimate both mean and unconditional quantile (UQ) regressions and evaluate this intervention on wage inequality. This analysis contributes to the growing literature that assesses MW interventions for developing and developed countries on the distribution of earnings and wage inequality using unconditional quantile treatment effects.

The results provide evidence that exposure to MW up-ratings increased wages from the 10^{th} to the 90^{th} percentiles between 3.3% and 5.5%, respectively. Overall, the policy is not associated with reducing inequality. The MW up-rating appears to be a mechanism that plays a crucial role in wage inequality for public sector workers. Perhaps due to the use of the MW as a numeraire for increments in salary payments across the public sector pay scales. However, the influence of other labour market confounders may have coincided with the introduction of this policy, thus, challenging its interpretation as a causal effect.

Keywords: Minimum Wage, Unconditional Quantile regression, Wage Inequality, Mexico
JEL classification: J01; J31; J38

1. Introduction

The Minimum Wage (MW) has been a policy in the labour market used to influence wage levels and wage inequality in both developed and developing economies. Minimum wages are generally motivated by the government's objective of raising the earnings of the lower-paid workers as they are used as a wage floor system to improve their welfare, lessen inequality, and alleviate poverty among low-income households.

The final impacts of MW policies are difficult to predict as they depend on several factors. *Inter alia*, how the MWs' up-ratings are determined, which type of workers are covered, the competitiveness in the labour market, the elasticities of demand and supply of relevant labour inputs, and to the extent to which MWs are complied with or enforced. The ongoing debate is because, on the one hand, the policy could redistribute resources in a welfare-enhancing way, which has the potential to reduce poverty, boost productivity, and foster economic growth. If an up-rate in the MW (or an expansion in coverage) increases the wages of low-paid workers, it would compress wages between high-paid and low-paid workers and therefore decrease the measure of wage inequality.

On the other hand, MW interventions could increase the costs for employers, potentially reducing their labour force size, leading to higher unemployment rates and worsening low-income households. Thus, they could misallocate labour in the formal sector and have spillover effects on high-paid workers. In the informal sector, they could depress wages for the low-paid employees, thus, wasting resources and reducing growth rates. A fall in the MW real value (or a narrowing of coverage) could potentially result in rising wage inequality (Bell, 1997).

MW policies have been interpreted as successful welfare-enhancing tools in developed countries. The empirical evidence reveals they raised the pay of a sizeable group of workers, especially at the lower tail of the wage distribution and may have assisted in reversing rising wage inequality, albeit modestly.[1] For developing countries, MW interventions may help compress the bottom of the wage distribution but do not reduce wage inequality or are

[1] For example, Autor et al. (2016), Dickens and Manning (2004), Stewart (2012), Dolton et al. (2012), Kambayashi et al. (2013).

implicated in the growth of wage inequality. Nevertheless, the impacts are still a controversial debate and depend on the employment sector analysed, the nature of the policy investigated, the methodology implemented in the analysis, among other factors.

Understanding how the MWs affect labour markets and welfare is critical for developing effective labour market policies and poverty alleviation strategies (Ham, 2018). A common concern in Latin American countries is whether MW could be used as a tool to increase the earnings of (formal) low-income workers, reduce inequality, and thus assist lift households out of poverty (Cunningham, 2007).

Existing studies in Mexico mainly focus on the effects of the annual up-ratings on wages and employment, with few focusing on wage inequality. Generally, the growth in inequality is attributable to the deterioration in the MW real value over time and to the pay gap among public and private sector workers (Bell, 1997; Bosch and Manacorda, 2010; Fairris et al., 2008; Gasparini et al., 2015). Moreover, none of the recent papers using the institutional MW change in 2012 has examined the effects on inequality (Campos-Vázquez et al., 2017; Campos-Vázquez et al., 2020).

This paper evaluates the impact of the Federal mandated MW up-rate for a specific geographic zone in 2012. It tests whether the policy is associated with variations in formal sector wages across the unconditional wage distribution, and ultimately reducing wage inequality in Mexico over the period 2010-2015. The research exploits mean-based and unconditional quantile regression (UQ) methods using cross-sectional data. To assess the overall effects on wage inequality it exploits a Gini dispersion measure.

The evidence suggests the exposure to the MW up-rating in the treated MW zone increases wages across the unconditional hourly wage distribution, strongly at the bottom end of the distribution, which is in comport with other developing countries. Particularly, the effects persist higher up the unconditional distribution than generally found in the literature, indicating that wage inequality has not been reduced. In the public sector, the impact is conjectured to the MW role as a numeraire in the award of increments in the payments.

The contribution to the literature is in several ways. First, this research adds to the growing literature using unconditional quantile treatment effects (UQTE) to evaluate the impacts of the MW interventions for developing and developed countries. Second, it is among the few studies assessing the effects of MW policies on wage inequality in a developing country context. Third, it is the first study analysing the 2012 MW policy on wage inequality in Mexico, thus, updating previous results.

The following sections present the literature review and the institutional labour market context. A description of the data and the outlined empirical strategy are provided in Sections 4 and 5. The empirical results and robustness checks are then presented. The concluding remarks are contained in the final section.

2. Literature Review

There is an extensive literature focussed on what drives inequality in developing countries, and its association with education, wages, informality, and trade. Wage inequality is primarily linked to the rise in the supply of skilled workers, which is also associated with the sustained effort made by developing country governments to expand basic education.[2] Likewise, inequality is associated with an increased demand for labour of low-skilled intensive goods for exports.[3] Co-existing with skilled labour, a large informal sector in Latin America, where wages are lower and unregulated, is found as a mechanism that increases wage inequality.[4]

MW settings, payment-settings, and unionizations are generally perceived to protect the lowest paid and narrow the bottom end of the pay distribution.[5] Most of the MW literature emphasizes the effects on employment and wages for developed economies (e.g., the United States (US), the United Kingdom (UK), Germany and Canada), the effects on wage inequality are less common.

[2]Campos-Vázquez et al. (2014); Binelli (2016); Lustig et al. (2013).
[3] Acosta et al. (2017); Binelli (2016); Esquivel et al. (2010).
[4] Informality generally attracts the least skilled, women and the youngest workers (Rosser et al., 2000; Binelli and Attanasio, 2010; Binelli, 2016).
[5] Although the MW legislation is binding for the formal sector, some studies provide evidence of spill-over effects to the uncovered sector in developing countries (e.g., Campos-Vázquez and Rodas Milián, 2020 for Mexico; Leckcivilize, 2015 for Thailand).

For developed countries, the evidence is varied, Autor et al. (2016) found growth inequality in the lower tail of the wage distribution for the US attributable to a decline in the real value of the MW (i.e., the 50^{th} - 10^{th} percentiles of the log wage). In the UK, the National Minimum Wage (NMW) set below the 10^{th} percentile do not influence inequality in the lower half of the wage distribution (i.e., the $50^{th}/10^{th}$ wage ratio), although it was effective in raising earnings of the lowest-paid workers (Dickens and Manning, 2004). However, Dolton et al. (2012) concluded that an increase in the bite of the NMW is associated with falls on earnings in the lower tail of the distribution.

There is a high level of wage inequality in developing countries, where MWs tend to be set generally at a higher rate (Maloney and Nuñez, 2003) and are less likely to be rigorously enforced (Kanbur and Ronconi, 2016). Besides, labour force includes a high percentage of low-earners and informal workers (Ham, 2018; Wong, 2019).

Existing research highlights the shortcomings of the MW in reducing inequality. Yamada (2016) found for Indonesia positive effects on earnings, but negative effects on the number of hours worked. MWs do not close gender pay gaps, improve living standards or reduce inequality. In Thailand, the MW appears to help compress the lower part of the formal wage distribution without reducing overall wage inequality in the informal sector, may be due to the high non-compliance rate and the weak law enforcement (Leckcivilize, 2015).[6] Gasparini et al. (2015) found for Latin America, a public sector with a satisfactory level of earnings equality, whereas higher levels of inequality for the private sector.[7]

Bell (1997) suggest the MW was too low to influence formal manufacturing wages for skilled workers in Mexico.[8] Thus, the deterioration in the MW real value could not be responsible for the subsequent increase in wage inequality or unemployment. Besides, there is a significant non-compliance in the formal sector for women and unskilled workers whom are

[6] The wage is concentrated more around the MW in the informal sector compared to the formal sector. However, this is something of a paradox because the informal sector of the economy is thought to be mostly immune to government regulations of this sort. Thus, for Leckcivilize (2015) the MW acts as a benchmark in wage negotiations.

[7] The Gini coefficient for hourly earnings in the public sector was, on average, 0.369 in 2012 compared to 0.387 for private sector workers in large firms, and 0.494 for other private sector workers.

[8] Bell (1997) and Fairris et al. (2008) suggest that wage levels tend to be well above the MW, and there is no clustering in the distribution around the level at which it is set.

generally paid below the MW. Fairris et al. (2008) also implies that the pay of low-skilled workers is more likely to be influenced by MW norms than the pay of high-skilled workers.

Bosch and Manacorda (2010) provide evidence of an increase in wage inequality at the bottom end of the wage distribution (i.e., the 10^{th}–70^{th} and 20^{th}–70^{th} wage percentile gap) between 1989 and 2001 in Mexico. In addition, 10 percentage points increase in the effective MW raises earnings at the bottom decile by almost seven percentage points, and median earnings by around three percentage points relative to the 7^{th} decile. The direct and indirect impact of the opening of the economy (e.g., through trade, foreign direct investment, and other liberalization policies) could have contributed to the rise in the wage gap by skill group.

The Gini values for Mexico in 2012 were 0.449 and 0.451 for public and private sector workers, respectively, suggesting significant pay disparities and inequality (Gasparini et al., 2015). It is argued to be due to the steep decline and deterioration in the real value of the MW and the stabilization programs established since 1980s.

The effects of MW up-ratings have been analysed through fixed-effects models (e.g., Leckcivilize, 2015; Yamada, 2016); instrumental variables to capture the potential endogeneity between wages, MWs, and employment (e.g., Bosch and Manacorda, 2010)[9]; difference-in-differences (D-i-D) for comparing observations initially earning below the MW to those above the MW (e.g., Dolton et al., 2012; and Stewart, 2012 for the UK) or for evaluating the different bites across regions (e.g., Autor et al., 2016 for the US; Campos-Vázquez et al., 2017 for Mexico; Ham, 2018 for Honduras; Wong, 2019 for Ecuador).

The literature interested in understanding the distributional average impacts of treatment participation (e.g., in the lower, middle or upper tail of the wage distribution) using conditional (Callaway and Li, 2019; Callaway et al., 2018) and unconditional (Firpo et al., 2009; Hernaes, 2018; Pérez, 2020) quantile regressions for analysing institutional changes in the labour market, such as the MW legislation, is limited.

[9] Bosch and Manacorda (2010) use Instrumental variables with the ENEU survey and Social Security data (IMSS -Spanish acronym) from gross formal workers to provide error free estimates of average earnings across municipalities and time. Their procedure purges the estimates of the potential correlation between the included regressors and the error term due to potential measurement error.

In summary, the effects of MWs are somewhat controversial for developed countries. There are benefits of the earnings up-rating on low-paid workers with modest or ineffective impacts on wage inequality. The empirical evidence for developing countries is more varied. On the one hand, increases in MW help to compress the lower part of the wage distribution but do not reduce wage inequality. On the other hand, the decline of the MW real value accounted for the growing wage inequality in the lower tail of the distribution.

3. Institutional Features of the Mexican Labour Market

The Mexican labour market and industrial relations legislation are extremely detailed and complicated, as they are contained in several laws comprising thousands of legal articles. The legislation is also outdated because the Constitution dates back to 1917, the main article related to labour (Article 123) has experienced only minor reforms since then. The Federal Labour Law (LFT), enacted in 1970, has been subject to minimal amendments to increase benefits for workers and reduce the flexibility with which labour can be fired or dismissed.

As in many other Latin American countries, the Mexican legislation is characterised by generous mandated benefits and a high level of job protection. Employers should comply with several regulations, including MWs, the maximum length of the working day, overtime pay, social security contributions, severance payments, maternity leave, on-the-job training provisions, non-discrimination policies and share profits with their employees. Nonetheless, there is a high degree of non-compliance, a large share of workers do not receive the required benefits. Although, downward nominal wage rigidities are well-known —albeit little understood— fact in the Mexican labour market (Castellanos et al., 2004).

MWs serve as a norm for wage settings at the micro-level, where many prices are fixed or tied to multiples or fractions of the MW such as fines, bails, pensions, income brackets for income tax rates, eligibility for certain social services (e.g., housing credits), bonuses as part of fringe benefits, and productivity bonuses for university professors (Bosch and Manacorda, 2010; Castellanos et al., 2004; Fairris et al., 2008).

The use of multiples of the monthly MW is consistent with the role of a numeraire that it traditionally plays in the Mexican economy. It is a common practice among workers and

employers to report wages in multiples of MW even in the informal sector. It has become an important benchmark for fair remuneration in relative pay across occupations and is acknowledged as such by workers.

The effect of the numeraire in the region is far stronger than that found by Neumark and Wascher (2007) in the US, suggesting that the MW induces far-reaching rigidities in the labour market. There is evidence for Brazil, Mexico, Argentina, and Uruguay that MW serves as a reference throughout the economy, including sectors not legally bound by it, and influencing wage-setting in the informal sector (Maloney and Nuñez, 2003).

Bell (1997) and Fairris et al. (2008) also suggest the MW stopped exerting power in the Mexican economy because it has been at the bottom end of the wage distribution since the second half of the 1980s. Conversely, Bosch and Manacorda (2010) argued its use in urban municipalities as numeraire explains the cluster at monthly wages and the spill-over effects at higher percentiles of the pay distribution (up to the 60^{th}-70^{th} percentile).

This is as a mechanism for indexing wages to changes in the cost of living, although not enforced by law (Azuela de la Cueva et al., 2014; Fairris et al., 2008; Maloney and Nuñez, 2003). Labour unions, firms and workers implicitly use it in their wage bargaining and to index contracts (Castellanos et al, 2004). Governmental payments, and public expenditures are expressed in multiples of the MW, which could have a broader impact on public finances (Azuela de la Cueva et al., 2014). By January 2014, approximately 280 Federal laws were indexed to the MW, the process to deindex them started in December 2014.[10]

At a macro level, the MW has played a role in stabilization policies throughout the 1980s and 1990s as a response to the high degree of volatility in inflation and GDP growth rates. Its feature as a nominal anchor for the labour market and the overall economy is also common in other Latin American countries (Bosch and Manacorda, 2010; Fairris et al., 2008).

[10] https://www.gob.mx/conasami/es/articulos/desindexacion-del-salario-minimo-68707?idiom=es

3.1 The Minimum-Wage System in Mexico

The MW in Mexico is a constitutional right for all formal sector workers. Article 123 specifies it needs to be sufficient to satisfy the elementary necessities covered by a head of household, such as the ability to purchase the basic alimentary basket of goods and provide for their children's compulsory education.

Since 1962, the daily MW setting has been assigned to a tripartite National Commission for Minimum Wages (CONASAMI) that comprised representatives from businesses, labour unions, and the government.[11] There are two different daily minimum wages, the "general" and the "occupational". The latter is specified for low-wage occupations with a monetary value slightly higher than the general MW set for other professions. [12]

MWs vary by geographic zones depending on their level of economic development. They are consolidated by groups of municipalities regardless of the state they belong to. Some states can set up a different MW within the state because their municipalities could be assigned to different MW zones. The inclusion or exclusion of the municipalities in the zones have been changing over time. In 1986, there were three zones represented by A, B, and C.

The assignment intended to deliver approximately the same real value of the daily MW in each zone. However, zone A set the highest nominal and real MW, and zone C the lowest. Area A encompasses the capital city, cities close to the US border, some tourist resorts, and industrial hubs. The second and third most populated cities (Guadalajara and Monterrey) belong to area B along with some other developed cities. The smaller and rural municipalities of the country in conjunction with a few developed cities and other important touristic resorts (e.g., Cancun) are consigned to area C. In 2010, there were 2,462 municipalities; 65 belonged to zone A, 55 to zone B, and 2,342 to zone C. Area C accounted for 63% of the workforce, while areas A and B accounted for 11% and 26%, respectively.

[11] http://www.conasami.gob.mx/m/quienes_somos.html

[12] Including construction workers, cashiers, truck drivers, operators of machinery, attendants at retailers, stonemasons, carpenters, and nurses, among others. In 2010, there were 73 occupations listed whereas in 2015 there were only 59.

In November 2012, the legislation streamlined the geographic areas into two zones. The new zone A included the municipalities of the previous areas A and B, whereas the new zone B was thereafter the municipalities that originally were in zone C. Zone C never mixed its municipalities with any other zone.

Fairris et al. (2008) and Moreno-Brid et al. (2014) argue that the criteria for the annual nominal MW up-ratings per zone is based on the anticipated and not the current inflation rate since 1984, which have had more of an inflation stabilization function (based on aggregate economic conditions) rather than one designed to preserve the minimum purchasing power of workers. Moreno-Brid et al. (2014) argued that the 2012 MW up-rating was less than the inflationary impact and therefore occurred only to maintain the purchasing power of 2005.

Table 1 reports the MW in 2012 and 2013, the values have the same pattern established back in 1986, zone A held the highest MW and zone C the lowest.

Table 1: Daily General Minimum wages in Mexico

Period	Minimum wage zone		
	A	B	C
January 2012	62.33	60.57	59.08
November 2012	**62.33**	**60.57**	-
January 2013	64.76	61.38	-

Source: CONASAMI, 2012-2013. Nominal Mexican pesos. 4.35 US dollars in zone C in January 2012 and 4.82 US dollars in January 2013.

The institutional change in the MW setting creates two groups. The treatment group are those individuals in the municipalities that used to be in zone C and became zone B by November 2012, for which the policy increased their daily general MW in nominal values. As this MW zone never combined with any other, it is a clearly defined treatment group (72.8% of the sample). The control group comprises the individuals in the original zone A, prior to and after the policy in 2012, where the intervention is not directly binding. The MW did not change (14.5% of the sample).[13]

[13] The municipalities that belonged to Zone B before the intervention in 2012 are considered as the miscellaneous group as they are combined with the original zone A after the policy and, thus, are potentially contaminated by the treatment effect. This comprises 12.7% of the sample (22,100 observations). By January 2013 the usual annual up-rating was applied to the two MW zones.

4. Data

The study exploits cross-sectional data obtained from various rounds (2010–2015) of the Mexican National Occupations and Employment Survey (ENOE -Spanish acronym) available from the Statistics, Geography, and Informatics Institute (INEGI-Spanish acronym), which contains information for gainfully occupied and unoccupied individuals aged 12 years and over. It is a nationally representative survey of individuals, that reports, *inter alia,* weekly hours worked, monthly earnings, formal and informal job activities derived from the main and secondary occupations, and type of employment (public or private). The second quarter interview period of the survey is primarily used to avoid any seasonality in earnings since higher expenses are reported during the first and fourth quarters of the year due to extra bonuses.

The sample is restricted to male workers because the information reported in terms of earnings and other labour market variables are more complete and comprehensive for this gender group. The questions related to the labour market apply only to the employed and gainfully occupied individuals during the week of reference. The main occupation is identified by the interviewees as the one in which they spend most of their time during the day and which provides the highest remuneration.[14]

Among the information collected are the following: the economic sector where the individual works (e.g., services, agriculture, manufacturing); the type of occupation and activities undertaken (e.g., masonry, agricultural activities); the number of employees in the firm they are working in; if people own their businesses (or are farmers); and the type of rights the individuals are entitled to through their work contract.

This study uses the variable established by INEGI to define formal employment, which is mainly related to employment activities that provide access to social security or medical health services, and mostly coincide with work under a contract subject to employment rights. To ensure an accurate measure of the wage, all those individuals who are informal workers,

[14] It depends entirely on the individuals what is the occupation that they perceived as the main or principal job. People with a secondary job are 6.2% of the sample used in this analysis.

self-employed or unpaid workers are excluded from the sample because the MW laws are not binding for this group of workers.[15]

The data for the daily general MW, as well as the municipalities that integrate each MW geographic zone, are obtained from the CONASAMI. This information allows the association of every observation to the corresponding MW zone depending on the municipality in which the individual resides.

The sample is a pooled cross-sectional database of 173,669 individuals from the period 2010 to 2015 with an average of 28,900 observations per year. It comprises 780 municipalities from the 32 Mexican States for the whole period with 500 municipalities per year on average. The minimum number of observations per cell is five (observations per municipality per year), the maximum is 982 and 382 on average. Approximately, 73% of the sample belong to the MW zone C, 14% to zone A, and 13% to zone B.

4.1 Outcome variable: log of hourly wage

The natural logarithm of hourly wages is the outcome variable of interest. Earnings, in the survey, refer to a monthly payment received from the main job net of all labour taxes and social security contributions.[16] Hours worked reported weekly in the survey are multiplied by 4.3 to obtain the monthly values.[17] Hourly wages are computed from the reported monthly earnings divided by the computed monthly hours worked; the measure is in real Mexican pesos as of December 2010. This hourly wage variable is important to compare earnings among individuals. The analysis includes full-time and part-time workers.

Summary statistics of the wage variable within MW zones presented in Table 2 suggest wage gaps between the geographic MW zones, where zone C reported the lowest hourly wages. The Gini index, commonly used as an indicator for inequality and aggregate wage dispersion, yields values below 0.4 suggesting a level of earnings that is not very unequal. Similar values are reported for the Latin American region by Gasparini et al. (2015).

[15] Approximately 0.25% of the observations reported zero wages, which are excluded from the analysis.
[16] If the interviewees report weekly payments, the Mexican Statistics, Geography, and Informatics Institute transforms this into monthly earnings by multiplying the former times 4.3.
[17] The individuals work 48.7 hours per week, on average, and about 1% work between six and 18 hours per week in the sample.

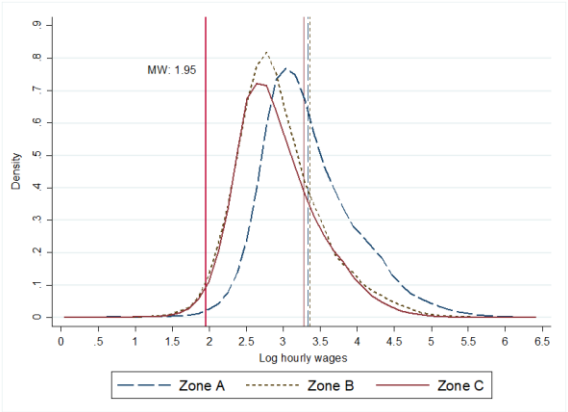
Table 2: Summary statistics of average wages

	Log hourly wage	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	Gini	Obs.
All observations	3.30	2.60	2.87	3.21	3.66	4.16	0.374	173,669
MW Zone A	3.33	2.65	2.91	3.23	3.69	4.22	0.379	25,094
MW Zone B	3.36	2.68	2.97	3.30	3.68	4.16	0.360	22,100
MW Zone C	3.28	2.57	2.85	3.19	3.65	4.15	0.375	126,475

Source: Mexican National Occupations and Employment Survey (2010-2015).

Figure 1 illustrates the kernel density distribution of log hourly wages by MW zones for the full period analysed. The wage distributions of zone B and C are farther left from the distribution of zone A, although workers in zone C retain the lowest average wages (represented by the vertical lines). The average of the mandatory hourly MW over the entire period is at the bottom end of the distribution and below the average wages of the three zones (1.95 log points).[18] There are no clusters around the mandatory MW in the distribution, similar to what Bell (1997) and Fairris et al. (2008) observed for Mexico in the 1980s; and Bosch and Manacorda (2010) reported for 2001.[19]

Figure 1: Distribution of log hourly wage by MW zones



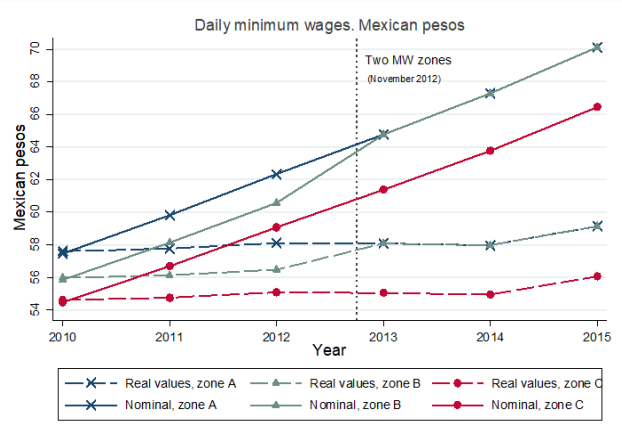
Source: Mexican National Occupations and Employment Survey (2010-2015).
Notes: Real values at 2010 Mexican pesos. The vertical lines represent the average log hourly MW in the three zones over the entire period (1.95 log points) and the average wages for each zone.

[18] The log of hourly MW is computed as the logarithm of the daily MW divided by eight as it is the stipulated length of the workday in hours in Mexican legislation. See Table 3.
[19] Esquivel (2015) argued that in 2015 the MW was below the market levels, even for unskilled workers, and below the accepted poverty threshold.

Figure 2 exhibits the daily general MW for each geographic zone. The values are deflated by the national consumer price index (INPC) and converted to December 2010 prices. The highest MW was assigned to zone A. The vertical dashed line indicates the time when the amalgamation of zones A and B was undertaken. In the case of zone C, it became zone B after this merger.[20] This graph reveals common trends for the MW in each zone across the period analysed for both real and nominal values.

Although there have been up-ratings in the daily MW by zones, the plot below reveals relatively stable real values between 2010-2014 that slightly increased in 2015. This real values trend has been noted extensively in the literature (Bosch and Manacorda, 2010; Campos-Vázquez et al., 2014; Moreno-Brid et al., 2014).

Figure 2: Nominal and Real values of Daily Minimum Wage



Source: CONASAMI 2010-2015, January of each year. Real values in 2010 Mexican pesos. Daily general MW refers to eight daily hours worked.

Table 3 reports the statistics for the daily general MW. The streamlined into two zones was occurred in November 2012 (A and B). The hourly MW is computed as the logarithm of the mandated daily MW divided by eight, the number of hours stipulated in the Mexican legislation for a workday, the average is 1.95 log points. The last columns report the real log of hourly wages for the 10th, 50th and 90th percentiles from the sample for each MW zone, which generally decreased after 2012.

[20] For the growth rate of the daily MW, see Figure C1 in Appendix C.

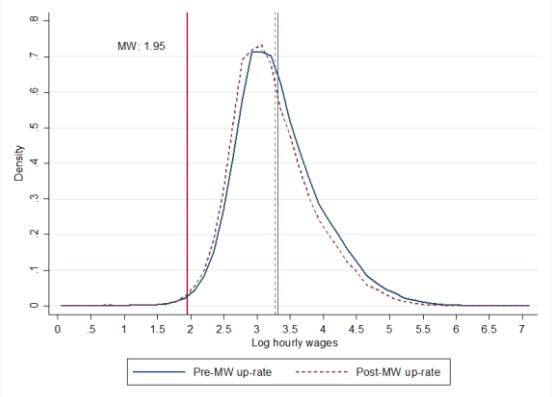
Table 3: Real Minimum wage and wages in Mexico

Year	Daily MW (Mexican pesos)			Log hourly MW			10th percentile log hourly wage			50th percentile log hourly wage			90th percentile log hourly wage		
	MW geographic zone														
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
2010	57.46	55.84	54.47	1.97	1.94	1.92	2.68	2.69	2.59	3.31	3.35	3.23	4.28	4.26	4.21
2011	57.62	55.99	54.61	1.97	1.95	1.92	2.67	2.69	2.59	3.28	3.27	3.20	4.30	4.14	4.17
2012	57.97	56.33	54.95	1.98	1.95	1.93	2.67	2.70	2.58	3.25	3.29	3.20	4.24	4.12	4.15
2013	57.93	54.90	-	1.98	1.93	-	2.66	2.56	-	3.25	3.19	-	4.18	4.14	-
2014	57.83	54.80	-	1.98	1.92	-	2.64	2.55	-	3.22	3.18	-	4.15	4.12	-
2015	58.99	55.92	-	2.00	1.94	-	2.66	2.58	-	3.23	3.17	-	4.14	4.13	-

Source: Mexican National Occupations and Employment Survey (2nd quarter 2010-2015).
National Commission for Minimum Wages (2010-2015). January of each year (April in 2015). Real values in December 2010 Mexican pesos.

The distribution of log hourly wages before and after the MW up-rate in November 2012 is illustrated in Figure 3. The distribution and its average wage value shift slightly to the left after the MW up-rating, suggesting that the policy did not increase wages or offset the erosion of the real wages due to inflation over the period analysed.

Figure 3: Distribution of log hourly wage pre-and post- the MW up-rate



Source: Mexican National Occupations and Employment Survey (2010-2015). Real values at 2010 Mexican pesos.

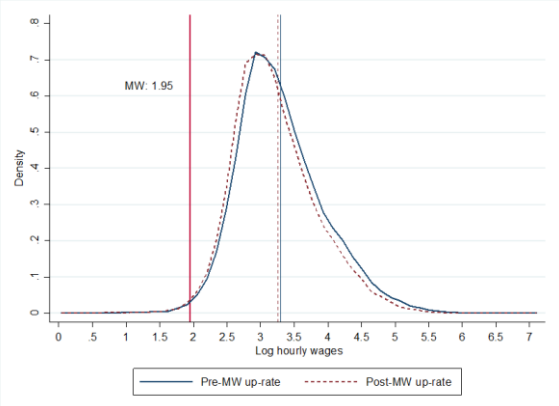
The wage policy in Mexico has been conceived as a mechanism to contain inflation. During the 1980s and 1990s the general rise in prices was counteracted, in part, by a strategy that limited wage increases below the price increases, this scheme was not designed to preserve the minimum purchasing power of workers. Since the 2000s, the real MW has been remained

constant and its purchasing power has drastically decreased (Esquivel, 2015; Fairris et al., 2008; Moreno-Brid et al., 2014).[21]

Esquivel (2015) argued that although there is no evidence that the wage increases would have inflationary effects in the 2010s, as in previous decades, the wage policy has not changed in favour of increasing real wages. In addition, even though the annual inflation rate of 2.1% in 2015 was the lowest rate, between 1974 and 2020, the average during the period analysed (2010-2015) was 3.7%, similar to 3.6% in 2012 when the MW policy was implemented, suggesting that the wage polices have not been containing inflation.[22]

Figure 4 present similar wage distribution before and after the MW change in zone C with slight shifts for the post-treatment period, suggesting that the policy did not increase wages.[23]

Figure 4: Distribution of log hourly wage pre-and post- MW up-rate, Zone C.



Source: Mexican National Occupations and Employment Survey (2010-2015). Real values at 2010 Mexican pesos.

4.2 Treatment and control groups

Table 4, report the statistics for hourly wages of the treatment group before and after the intervention. Higher average wages are reported for before the intervention.[24] Figures 5 illustrates the distribution of log hourly wages by the treatment group for selected years (2010-2015), in 2015 it is farther left compared to 2010, indicating decreasing real hourly

[21] By 2014, the MW was a quarter of its purchasing power in 1976 and only a third of its value in 1969.
[22] The annual inflation rate in 2010 was 4.4%.
[23] See Figures C2 and C3 in Appendix C for the wage distributions of zone A and B.
[24] See Tables B1 and B2 in Appendix B for the statistics reported of the entire sample and the control group.

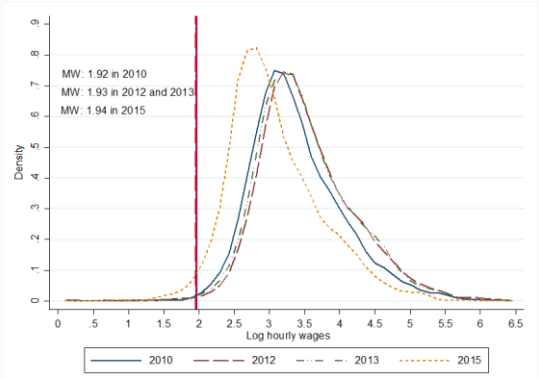
wages throughout the period.[25] The mandatory MW at the bottom end of the distribution has not substantially changed over this period.

Table 4: Mean values of hourly wages for treatment group before and after the intervention

Variable	Before treatment	After treatment
Log hourly wage	3.29	3.26
10th percentile	2.58	2.56
25th percentile	2.86	2.83
50th percentile	3.21	3.18
75th percentile	3.66	3.63
90th percentile	4.18	4.13
Gini	0.38	0.37
Obs.	62,541	63,934

Source: Mexican National Occupations and Employment Survey (2010-2015).

Figure 5: Distribution of log hourly wage by the treatment group



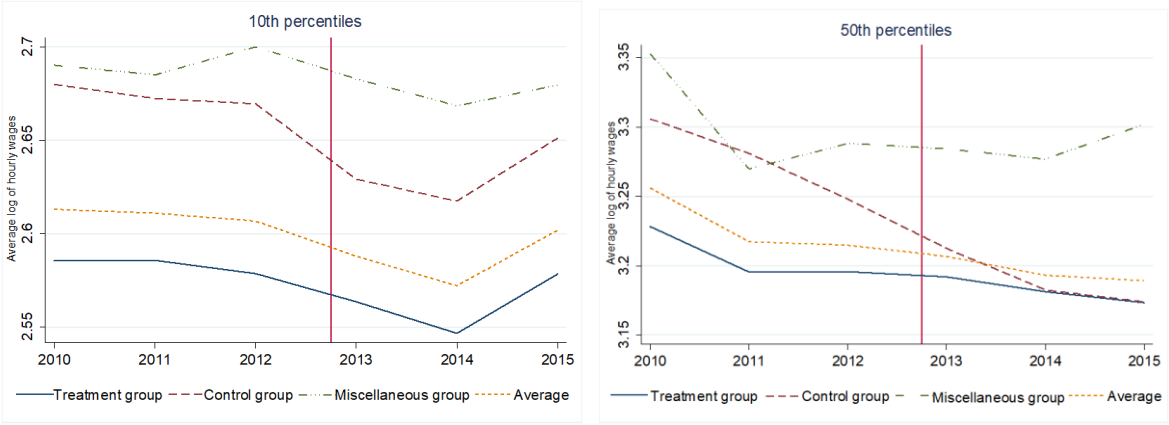
Source: Mexican National Occupations and Employment Survey (2010-2015). Real values at 2010 Mexican pesos. The vertical lines represent the log hourly MW.

Figure 6 contains the annual average log hourly wages for the 10th and 50th percentiles by groups. The wage gap between the treatment and control groups for the 10th percentile does not show any significant change before and after the intervention (represented by the vertical line). However, for the 50th percentile, the wage gap decreased from 2011, and after the reform, it narrowed sharply.[26] The average values of the treatment group are similar to the pooled sample as it represents 72.3% of the sample.

[25] See Figures C4 and C5 in Appendix C for the kernel density of the control and miscellaneous groups. There are no apparent changes in the wage distributions of the selected years.

[26] For the 90th percentile the annual average wage gaps narrowed from 2011 (see Figure C6 in Appendix C).

Figure 6: Trends of the log hourly wages for the 10th and 50th percentiles by group



Source: Mexican National Occupations and Employment Survey (2010-2015). The vertical line represents the time of the intervention.

Table 5 provides the standard difference in means of the log hourly wages between individuals treated and those not exposed to the MW up-rating, both before and after the intervention.[27] The effects reveal how the wages in these two groups changed before and after the policy implementation. The individuals in the treatment group have, on average, statistically significant lower real hourly wages compared to the control group for both pre-treatment and post-treatment periods, indicating that even before the implementation of the policy, the wages of the treated group were lower than that in the control group.

However, the difference-in-differences (D-i-D) is positive and statistically significant indicating that the intervention may have positive effects in raising wages of the treated group. In the absence of covariates, there is a 2.5% rise in hourly wages, on average, as a consequence of this policy.

[27] The standard difference in means reported here does not include fixed effects or robust standard errors.

Table 5: Difference-in-Differences estimation of wages for treated and control groups

Outcome var.	Obs.	log hourly wage	S.Err.	|t|	P>|t|
Before					
Control	23397	3.376			
Treated	62541	3.294			
Diff (T-C)		-0.082	0.005	-17.00	0.000***
After					
Control	23797	3.319			
Treated	63934	3.262			
Diff (T-C)		-0.057	0.005	12.02	0.000***
Diff-in-Diff	173669	**0.025**	0.007	3.61	0.000***

The observations in the control group are 47,194 and 126,475 in the treatment group.
Means and Standard Errors are estimated by linear regression
Inference: * p<0.1, ** p<0.05, *** p<0.01

4.3 Explanatory variables

The explanatory variables included in the specifications are age and its quadratic, years of education, urban or rural settlement area, marital status, the economic sector, and the employment sector (See Tables B3 and B4 in the Appendix B for the summary statistics of the covariates, also Tables B5 and B6 for statistics disaggregated for each group pre-treatment and post-treatment). The sample includes individuals aged between 15 to 65 years, capturing the minimum legal working age and excluding retirees or individuals of pensionable age. The average age is 36 years.

The married status encompasses individuals living together; single status includes widows, and divorced status incorporates separated people. The public sector workers include individuals at a parastatal company; social services run by the government; and workers at federal, state, and municipal levels. The private sector comprises workers in organizations run for private profits and not controlled by the government. Most of the respondents reside in urban areas (69%), are married (72%), employed in the services sector (46%), and working in the public sector (22%). These individuals enjoy higher average wages. [28]

5. Empirical Strategy

This study exploits the geographic variation of the 2012 MW policy in the formal Mexican labour market to analyse its impacts across the wage distribution and its implications for wage inequality. To determine the impacts, the analysis uses the unconditional quantile (UQ)

[28] Table B7 provides the t-test difference in means of the explanatory variables between individuals treated and not treated before the intervention.

regression approach based on the Re-centred Influence Function (RIF) originally popularized by Firpo et al. (2009).

The implementation of the wage policy creates an exogenous source of variation in the wages of the municipalities exposed to the policy compared to those not exposed. Thus, a conventional methodology for comparing observations pre-treatment and post-treatment is the difference-in-differences (D-i-D) approach, which is used in this study.

A regression model using a D-i-D framework would be valid if, for example, the path of earnings in the absence of the treatment does not evolve differently across the treated and untreated groups prior to the intervention. However, in this context, it is also more relevant to look at the effects of the MW policy on the lower quantiles relative to the top quantiles of the unconditional distribution. The unconditional quantile approach provides a simple and direct way to estimate the treatment effects at all points of the unconditional wage distribution, and potentially inform on the presence of inequality effects (Firpo et al., 2009).[29]

It identifies and estimates a distributional treatment effect parameter in the spirit of Hernaes (2018) in applying the RIF procedure based on the Firpo et al. (2009) methodology for unconditional outcomes, which assumes linearity with respect to the covariates. Hernaes (2018) uses UQ regression with a linear D-i-D model following the Firpo et al. (2009) method to estimate the average distributional effects of conditional outcomes based on a welfare policy change in Norway on the treated group compared to the control group. The OLS estimation of the UQ regressions allows it to be situated within a D-i-D framework.

The point of departure for understanding the RIF-based approach is the Influence Function (IF), extensively used in applied statistics, which represents the influence of an individual observation on the distributional statistic of interest $v(F_Y)$.[30] If the IF is centred around zero and the distributional statistic of interest is then added back to the IF and thus centred around

[29] The quantile regression method relaxes the assumption of homogeneity in the effects of covariates across the unconditional distribution of the dependent variable.
[30] Corresponding to the observable log of hourly wages.

the statistic of interest (e.g., the population mean "μ" E(Y)) and not zero (i.e., re-weighting the observations), then the RIF is generated (see Firpo et al., 2009).[31]

The expected UQ regression for quantiles is expressed in equation (1):

$$E[RIF(Y; q_\tau; F_Y)|X] = m_\tau(X) \quad (1)$$

which is the conditional expectation of the $RIF(Y; q_\tau; F_Y)$ modelled as a linear function of the explanatory variables where q_τ is the population of the τ^{th} quantile of the unconditional distribution of the outcome variable (Y), and where m_τ represents the effect of the X covariates on the unconditional τ^{th} quantile of the outcome variable (Y).

As this study uses the quantiles of the log hourly wages (w) as an outcome variable, therefore:

$$E[RIF(w; q_\tau; F_w)|X] = \gamma_\tau(X) \quad (2)$$

where γ represents the effect of the X covariates on the unconditional τ^{th} quantile of the log hourly wages (w).

The corresponding RIF quantile for the log wage dependent variable can be expressed as:

$$RIF(w; q_\tau) = q_\tau + [\tau - I(w \leq q_\tau)]/f_w(q_\tau) \quad (3)$$

where q_τ is the population quantile of the τ^{th} quantile of interest, and $f_w(q_\tau)$ is the density of the marginal distribution of the log hourly wages evaluated at q_τ (using kernel density estimation techniques). I(.) is an indicator function, which takes the value of 1 if the expression in parentheses is satisfied and zero otherwise. Thus, the RIF takes the value of $\tau/f_w(q_\tau)$ if the log hourly wage (w) is above the quantile value and a value of $[\tau - 1]/f_w(q_\tau)$ if the log hourly wage (w) is below or equal to the quantile value.

A key feature of this approach is that the mean of the RIF provides the quantile statistic of interest (e.g., 5^{th}, 10^{th}, 50^{th} or 90^{th} percentiles, or other selected quantiles) and can be approximated by a linear function. The OLS-RIF estimates first are derived from a linear probability model and are transformed into quantile effects using the reciprocal of the kernel

[31] In the case of the mean, since the RIF is simply the outcome variable *Y*, a regression of RIF (*Y; μ*) on *X* is the same as an OLS regression of *Y* on *X* (Firpo et al., 2009).

density estimates at the relevant quantile.[32] This means transforming probabilities into unconditional quantiles using the inverse of the probability density function of the log hourly wage distribution at each quantile. The RIF-quantiles are the dependent variables for each τ^{th} quantiles from the 5^{th} to the 95^{th} percentiles in this study.

The approach involves regressing the empirical RIF quantiles, constructed using expression (3), on a set of covariates using a standard OLS procedure within a D-i-D framework. Two different groups are used to assess the impact of the policy intervention: the treatment and the suitably chosen control groups. The latter is unaffected by the intervention, but otherwise similar to the treatment group (e.g., other jurisdictions or states where the policy did not change, high and low wage regions and/or demographic groups).[33]

The extent of variability in MWs across geographic zones is important for the empirical identification of wage inequality (treatment and control groups). The use of differences in the average wages across zones and municipalities with different MW incidence provided by the policy, which are assumed to be exogenous MW shocks, induces useful variation in the real bite of the MW net of the other confounding forces (see Ham, 2018 for Honduras).

This study seeks to determine the RIF unconditional quantiles treatment effects compared to the impacts on the control group. The RIF quantile regressions within a D-i-D approach using cross-sectional data are implemented using equation (4):

$$\widehat{RIF}\,(w_i, \widehat{q_\tau})_i = \beta_{0\tau} + \beta_{1\tau}\,(POST12_i) + \beta_{2\tau}\,(POST12_i * TREAT_i) + \beta_{3\tau}\,(POST12_i * Misc_i) + \beta_{4\tau}\,X_i + \delta_{k\tau} + e_{i\tau} \quad (4)$$

The RIF provides the quantiles for each percentile of w_i, which is based on the log hourly wage of individual *i* at the quantile τ. $POST12_i$ is a dummy variable assuming the value of one for all the observations on and after November 2012. $TREAT_i$ is a dummy variable indicating whether the individual *i* belongs to the municipalities treated after November 2012.

[32] In this analysis, the probability that the log hourly wage is below some pre-stated quantile value.

[33] The parallel trends assumption cannot be tested in this specific case because in the absence of the intervention, the outcomes in the treatment and control groups would have not necessarily evolve in a parallel fashion (Neumark et al., 2014 and Allegretto et al., 2017 cited in Dube (2019)). However, Figure 2 illustrates the assumption of parallel trends graphically.

$Misc_i$ takes the value of one if individual *i* belongs to the municipalities in the miscellaneous composite group after the policy in 2012.

As already noted, X_i comprises a set of covariates consisting of years of education, age and its square, urban settlement status, marital status, the economic sector, and the employment sector. δ_k are municipality fixed effects to control for macroeconomic shocks at the municipal level, and e_i is a random idiosyncratic error term.

The terms $(POST12_i * TREAT_i)$ and $(POST12_i * Misc_i)$ are the interactions terms between the dummy variables for the MW intervention and each of the treatment and miscellaneous groups respectively. The parameter of the former, $\widehat{\beta_{2\tau}}$, represents the treatment effect due to the MW policy at each τ^{th} quantile and is the key parameter of interest in this specification and for the empirical analysis undertaken here. It measures the effect of increasing the MW incidence on the unconditional wage distribution using the RIF transformation.

The RIF-based regressions can also be extended to a variety of inequality measures. The RIF-Gini approach provides a linear approximation of highly non-linear functionals such as the Gini coefficient. It offers insights on wage dispersion and is also estimated in this analysis. Only a few papers have used the RIF-Gini regressions to date to investigate changes in income (or wage) inequality (Firpo et al., 2018).[34]

The Gini coefficient is defined in equation (5):

$$v^G(F_W) = 1 - 2\mu^{-1}\, R(F_W) \qquad (5)$$

where $R(F_W) = \int_0^1 GL\,(p; F_W)dp$ with $p(W) = F_W(W)$ and where $GL\,(p; F_W)$ is the generalized Lorenz ordinate of F_W given $GL\,(p; F_W) = \int_{-\infty}^{F^{-1}(p)} z dF_W(z)$. The generalized Lorenz curve tracks the cumulative total of *y* (i.e., the outcome variable) divided by total population size against the cumulative distribution function (CDF). This can be interpreted as the proportion of hourly earnings going to a specific per cent of the lowest wage earners.

The RIF of the Gini coefficient following Firpo et al. (2018) can be written as:

[34] Such as Gradín (2016), and Choe and Van Kerm (2014) cited in Firpo et al. (2018).

$$RIF(W; v^G, F_W) = 2\frac{y}{\mu}\left[F_W(W) - \frac{(1+v^G)}{2}\right] + 2\left[\frac{(1-v^G)}{2} - GL\,(p; F_W)\right] + v^G \quad (6)$$

where $\frac{(1+v^G)}{2}$ and $\frac{(1-v^G)}{2}$ correspond to the areas above and below the Lorenz curve, respectively. The first term is unbounded because it increases by the factor W/μ, while the second is bounded between $v^G - 1$ and $1 + v^G$. Thus, the $RIF(W; v^G, F_W)$ is continuous and convex in W, the hourly wages. The function is theoretically unbounded from above, but in practice, it reaches its maximum at the upper bound of the empirical support of the distribution. Then the Gini coefficient is not robust to measurement error at higher earnings.

The RIF-Gini within a D-i-D approach is implemented using the specification reported in equation (7) below:

$$\widehat{RIF}\left(v^G{}_i, F_W\right)_i = \theta_0 + \theta_1\,(POST12_i) + \theta_2\,(POST12_i * TREAT_i) + \theta_3\,(POST12_i * Misc_i) + \theta_4 X_i + \delta_k + \eta_i \quad (7)$$

where the dummy variables $POST12_i$, $TREAT_i$ and $Misc_i$ are analogous to those used in equation (4). Likewise, X_i comprises the set of covariates, similar to the ones used in equation (4). δ_k are the municipality's fixed effects and η_i is a random idiosyncratic error term.

The estimated coefficient $\widehat{\theta_2}$ of the interaction between the dummy variables for the MW intervention and the treatment group ($POST12_i * TREAT_i$) represents the treatment effects due to the policy on the RIF-Gini coefficient, which is of primary interest in this specification.

It is worth noting that the Gini index cannot distinguish between the decline in wage inequality in the lower or the upper part of the wage distribution. This limitation emphasizes why the analysis reported here primarily focuses on quantiles. Nonetheless, the RIF-Gini complements the results derived from the UQ regressions, which provides an insight into the impacts of the MW policy on overall wage inequality.

6. Empirical Results

The empirical results shed light on the wage inequality patterns observed in Mexico from 2010 to 2015 when the 2012 MW up-rating was implemented. The estimated effects of key interest for the RIF-quantiles and the RIF-Gini specifications are captured by $\widehat{\beta_{2\tau}}$ and $\widehat{\theta_2}$.

6.1 Unconditional Quantile Treatment Effects

The standard OLS estimate for the logarithm of hourly wages reports, on average, an increase of 5.6% in wages as a consequence of the MW up-rating (see Table 6).[35] It is acknowledged that this average MW effect appears somewhat on the high side given the average increase of 2.5% reported earlier in Table 5. The estimated UQ effects of $\widehat{\beta_{2\tau}}$ from equation (4) for the 5th to the 95th percentiles of the log hourly wage distribution provide evidence that the exposure to an up-rating for formal employees in the treated MW zone increases wages across the entire unconditional wage distribution (see Figures 7 and 8).

The treatment effects in the lower tail of the wage distribution range from 3.2% at the 5th percentile to 5.7% at the 30th percentile. These effects subsequently oscillate around the mean value up to 6% at the 50th percentile. Then they range from 5.2% at the 51st percentile to 8.9% at the 95th percentile of the wage distribution.[36]

Therefore, the increase in wages associated with the policy was not only for the lower-paid workers but also experienced up to the higher-paid workers, with sharper impacts for the latter.[37] Almost all the confidence intervals for the quantile estimates contain the OLS estimate, suggesting there is very little heterogeneity in the MW effect across the unconditional wage distribution (see Figures 7 and 8).

Table 6 reports the standard OLS, the RIF-Gini, and selected RIF-quantiles estimates. The estimates rise up from the 10th (3.3%) to the 90th percentile of the distribution (5.5%). The mean effect (5.6%) is homogeneous across the wage distribution, and thus, the MW up-rating increases wages similarly across the entire unconditional distribution. Therefore, the MW policy does not have any particular effect on wage inequality, as confirmed by the statistically insignificant coefficient of the RIF-Gini.

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[35] See Appendix A1 for details of this model specification. Table B8 in Appendix B reports all the coefficient results of the standard OLS regression with log of hourly wages as dependent variable.

[36] See Table B9 in Appendix B for all the coefficient results of selected percentiles.

[37] The estimated effects for years of schooling show that for the first lower half of the distribution all the values are below the standard OLS estimation of log hourly wages (7.2%), they remain positive and statistically significant all the way up to the top of the distribution, suggesting that there is fanning out effect of education on the wage distribution. The effects are considerably lower (higher) at the 10th (90th) percentile of the unconditional hourly wage distribution, 3% and 13%, respectively. This reinforces previous findings in the literature on the role of education in widening wage inequality.

Figure 7: Effects of the MW up-rating on the lower half of the wage distribution

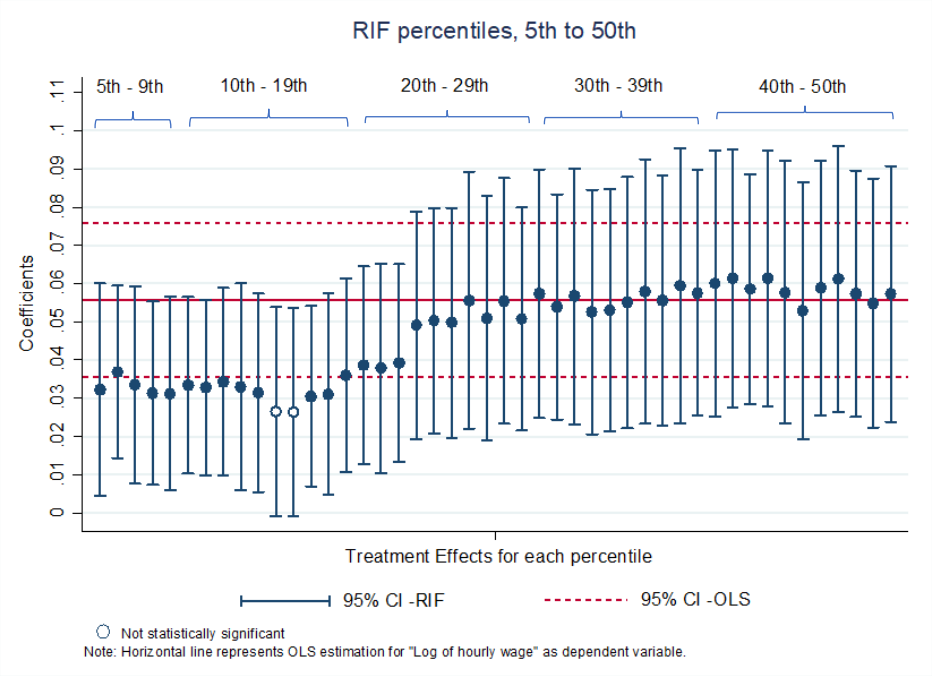


Figure 8: Effects of the MW up-rating on the upper half of the wage distribution

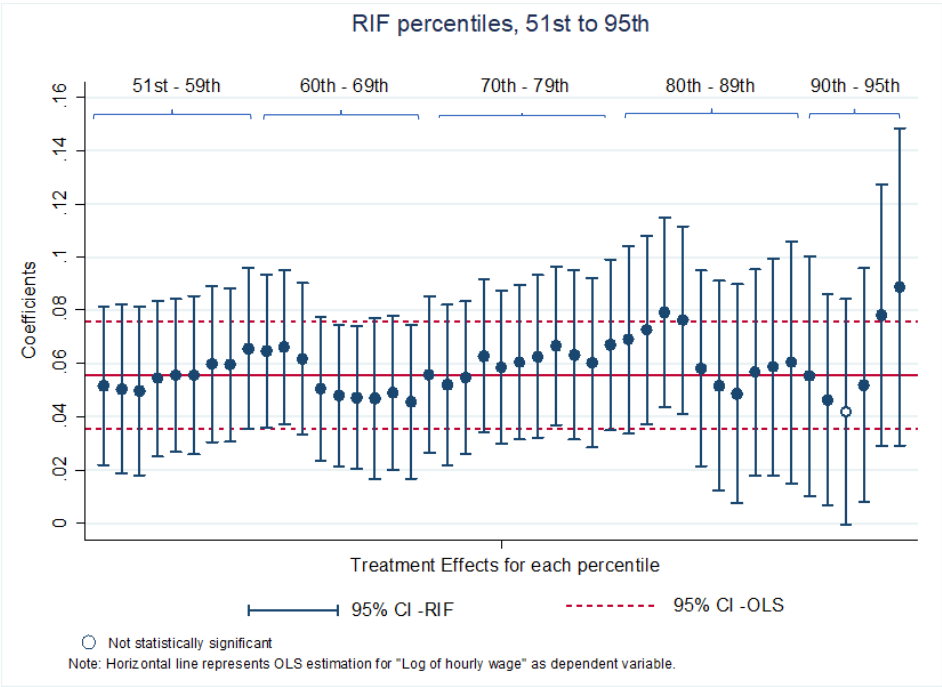


Table 6: MW Treatment effects for selected percentiles

	(1) Log hourly wage	(2) RIF-Gini	(3) RIF 10	(4) RIF 25	(5) RIF 50	(6) RIF 75	(7) RIF 90
Treatment effects	0.056***	0.011	0.033***	0.050***	0.057***	0.063***	0.055**
	(0.010)	(0.009)	(0.012)	(0.015)	(0.017)	(0.016)	(0.023)
Obs.	173,669	173,669	173,669	173,669	173,669	173,669	173,669
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: ** p<0.05, *** p<0.01
The sample is constructed from the 2010-2015 Mexican National Occupations and Employment Survey.
Municipality Fixed effects. Standard errors adjusted for 780 clusters at municipality level in parentheses.
Model (1) OLS standard estimation.

The policy does benefit the individuals in the treated group by increasing their wages. The treatment effects observed are consistent with the positive impacts of the MWs on the mid-to-lower tail of the wage distribution found in the literature (e.g., Bosch and Manacorda, 2010; Campos-Vázquez et al., 2017; Fairris et al., 2008). Although, the average effects reported here are larger than the average increase of 2.5% reported in Table 5.[38] It is in comport with the MW intervention's goal of raising the earnings of the individuals receiving the lowest wages. However, the MW's role as a benchmark for wage adjustment does not appear to reduce overall wage inequality in Mexico.

The mid-to-lower tail effect of the wage distribution could be a consequence of the low MW value, located at the bottom end of the distribution. It could influence the pay of workers positioned below the median of the wage distribution. However, Bell (1997) and Fairris et al. (2008), suggests that the deterioration in the real value of the MW could reduce its potential ability to compress the earnings distribution.

Thus, at the mean-based, the MW up-rating could be successful to some extent in offsetting the eroding effects of inflation on real wages. But the MW level is likely to be too low to influence wages for the mid-to-upper tail of the pay distribution. The impacts at the top of the wage distribution have not been alluded to extensively in the literature. [39] Some of these effects are perhaps due to the strong role that the numeraire plays in the Mexican economy,

[38] Although, the values are sizable in this analysis compared to the magnitude of previous effects found for Mexico, which were of the order of 1.6%-2.6%.
[39] Autor et al. (2016) found for the US over the period 1979-2012 effects on the entire wage distribution that were explained mainly by the presence of measurement error in earnings in the survey.

and the use of the MW as a benchmark for bargaining over workers' payment even in the uncovered informal sector (Azuela de la Cueva et al., 2014; Fairris et al., 2008; Maloney and Nuñez, 2003; Moreno-Brid et al., 2014).

The sizable impacts beyond the median of the wage distribution are questionable as these are higher compared to those found in the literature to date. Bosch and Manacorda (2010) argued the spill-over effects to higher percentiles of the earnings distribution up to the 60th percentile, in their analysis, is due to the numeraire in the Mexican economy. Their effects were found stronger at the bottom rather than at the top end of the wage distribution.

This analysis acknowledges that there must be other institutional factors and events that were concurred in the Mexican labour market with the MW up-ratings during 2010-2015, and that exerted an influence on the entire unconditional wage distribution, especially at the top end. Thus, the interpretation of the estimates is questionable, and the role of such confounders challenge the causal identification of the key effect of interest.

6.2 RIF-Gini coefficients

The RIF-Gini approach assesses the overall effects on the average wage inequality. The estimated effects, $(\widehat{\theta_2})$, for specification (7) complement the UQ estimates presented above. The analysis uses the pooled sample and two additional sub-samples that comprise the public and private sectors, as the literature emphasizes that the employment differences could lead to widening inequality in Mexico.[40]

The results in Table 7 suggest that exposure to a certain MW up-rating does not reduce wage inequality. This corroborates the RIF quantile results of not decreasing inequality. On the contrary, the positive coefficients suggest that the MW policy could increase inequality, although only statistically significant in the public sector. The MW up-rating appears to be a mechanism that plays a crucial role in widening wage inequality for public sector workers (i.e., about 4.4 percentage points).[41]

[40] Gasparini et al. (2015); Mora-Salas and de Oliveira (2009); Pagán et al. (2002); Panizza et al. (2001). Figure C7 in Appendix C illustrates the trends of log hourly wages by employment sector.
[41] Table B10 in Appendix B reports all the coefficients of the RIF-Gini specification.

Table 7: RIF-Gini coefficients of unconditional estimates

	RIF-Gini approach Hourly wage		
	(1)	(2)	(3)
Sample	Pooled sample	Private sector	Public sector
Treament effects	0.011	0.000	0.044**
	(0.009)	(0.006)	(0.021)
Obs.	173,669	135,379	38,290
Covariates	Yes	Yes	Yes

Notes: ** p<0.05, *** p<0.01
The sample is constructed from the 2010-2015 Mexican National Occupations and Employment Survey. Municipality Fixed effects. Standard errors adjusted at municipality level in parentheses.

The estimates in the RIF-quantiles are mirrored in the RIF-Gini coefficients for the sub-sample of public sector workers with a strong effect on inequality. Potentially, some quantile effects observed between 2010 to 2015 reflect the changes in the wage dispersion within the public sector. However, the public sector is 22% of the total labour market, thus the overall effect on inequality is attenuated by this percentage. In addition, the effects may also be driven coincidently by other factors that occurred in the labour market over the same period.

For instance, it is arguable that the RIF-Gini impacts possibly coincide with the spending boom introduced by the Federal government in its efforts to mitigate the impacts of the financial crises in 2008, part of which found its way into public sector pay awards. The next section investigates further the effects of the MW up-rating on private and public sector workers as robustness checks.

7. Robustness checks

The MW intervention may have had an impact on the structure of the labour market in Mexico in terms of the changes in relative employment and earnings separately for the public and private sector workers.[42]

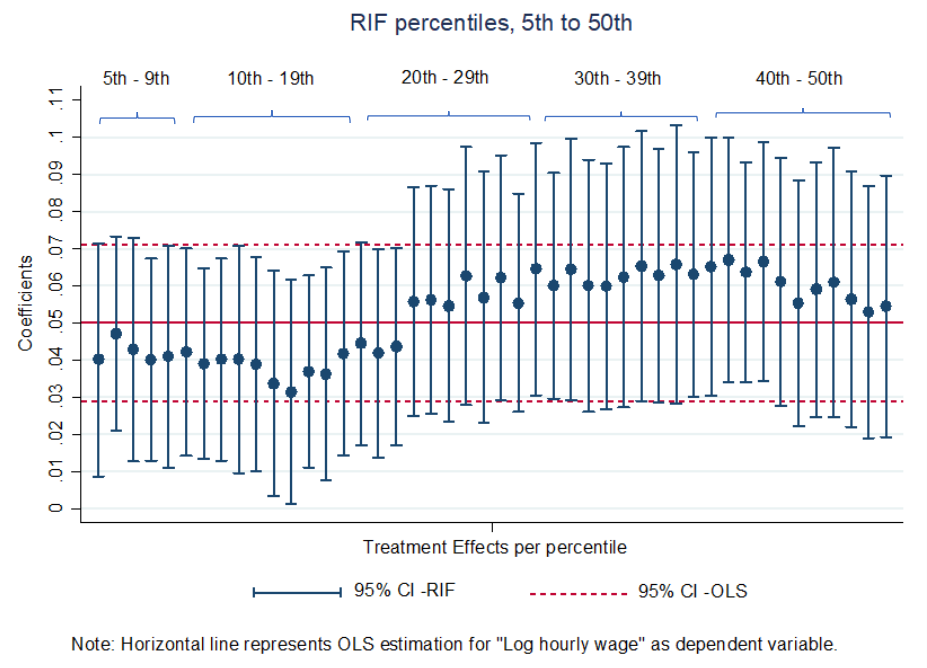
[42] A placebo in time test is implemented for the pre-treatment period with a false year for the introduction of the Federal Law in 2011 and 85,938 observations. The results are not statistically significant as expected.

7.1 Private sector

The sub-sample for the private sector workers comprises 135,379 observations (78% of the total sample). The treatment effects are reported in Figures 9 and 10. Compared to the mean-based impacts of 5% (see Table 8),[43] in the lower tail of the wage distribution, the MW policy raises wages by between 4%–6.7% from the 5th to the 43rd percentiles. The latter is the peak across the entire unconditional wage distribution, while the lowest effect of 3% is at the 16th percentile. The impacts subsequently fluctuate more in the second half of the distribution, between 6.5% at the 61st percentile and 3.3% at the 68th percentile.

Table 8 reports the OLS, the RIF-Gini and unconditional estimated effects for selected percentiles. Changes in the MW have strong and positive effects on private-sector wages, although the magnitude decreases by the 75th percentile and the statistical significance weaken afterwards. It suggests the policy increases wages similarly across the unconditional wage distribution and thus, not widening inequality among private-sector employees.

Figure 9: Treatment effects on the lower half of the wage distribution in the private sector



[43] The estimated effect comes from the OLS regression of the log hourly wages.

Figure 10: Treatment effects on the upper half of the wage distribution in the private sector

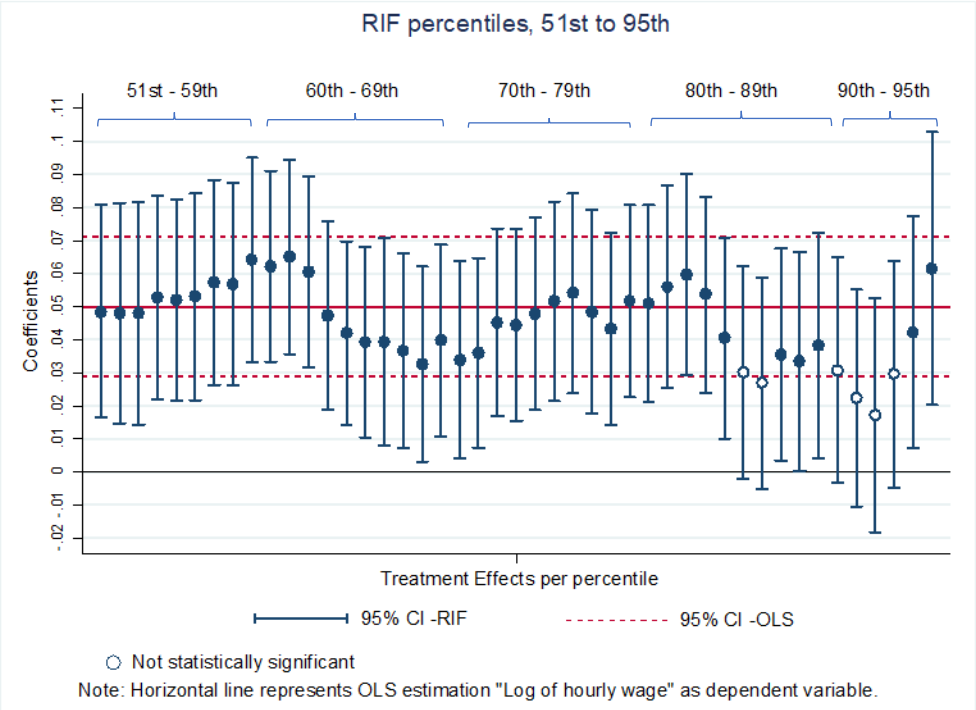


Table 8: Unconditional estimates in the private sector for selected percentiles

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log hourly wage	RIF-Gini	RIF 10	RIF 25	RIF 50	RIF 75	RIF 90
Treatment effects	0.050***	0.000	0.042***	0.055***	0.054***	0.052***	0.031
	(0.011)	(0.006)	(0.014)	(0.016)	(0.018)	(0.015)	(0.017)
Obs.	135,379	135,379	135,379	135,379	135,379	135,379	135,379
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: ** p<0.05, *** p<0.01
The sample is constructed from the 2010-2015 Mexican National Occupations and Employment Survey. Municipality Fixed effects. Standard errors adjusted for 769 clusters at municipality level in parentheses.
Model (1) OLS standard estimation.

In the pooled and private sector sub-sample, the estimates are stronger at the bottom end than at the top end of the unconditional pay distribution. However, the mean estimate falls within the confidence intervals of most quantile regression estimates suggesting the mean effect exhibits some degree of homogeneity across the distribution. It is worth noting that some of the impacts at the top of the wage distribution in the private sector could be related to the role that the numeraire plays in the Mexican labour market as a benchmark for wage adjustments,

but most probably other economic factors were coincidental with the MW up-rating in the private sector between 2010 and 2015 that could increase wages across the distribution.

7.2 Public sector

The quantile estimates for a sub-sample of 38,290 public sector workers (22% of the sample) are contained in Figures 11 and 12. The up-ratings in the MW have positive and statistically significant effects on wages mostly after the 17th percentile and further up the distribution until the 78th percentile. The stronger effects are centred around the median. In the lower part of the pay distribution, all the estimated effects are below the mean-based coefficient of 6.5% (see Table 9). The highest estimate is at the 94th percentile with 19.7%.

The impacts are also reported in Table 9 for selected percentiles. At the median, the treatment effect raises earnings by 5.8%. The RIF-Gini estimates reported that the MW may be implicated in driving wage inequality in the public sector (4.4 percentage points).

Figure 11: Treatment effects on the lower half of the wage distribution in the public sector

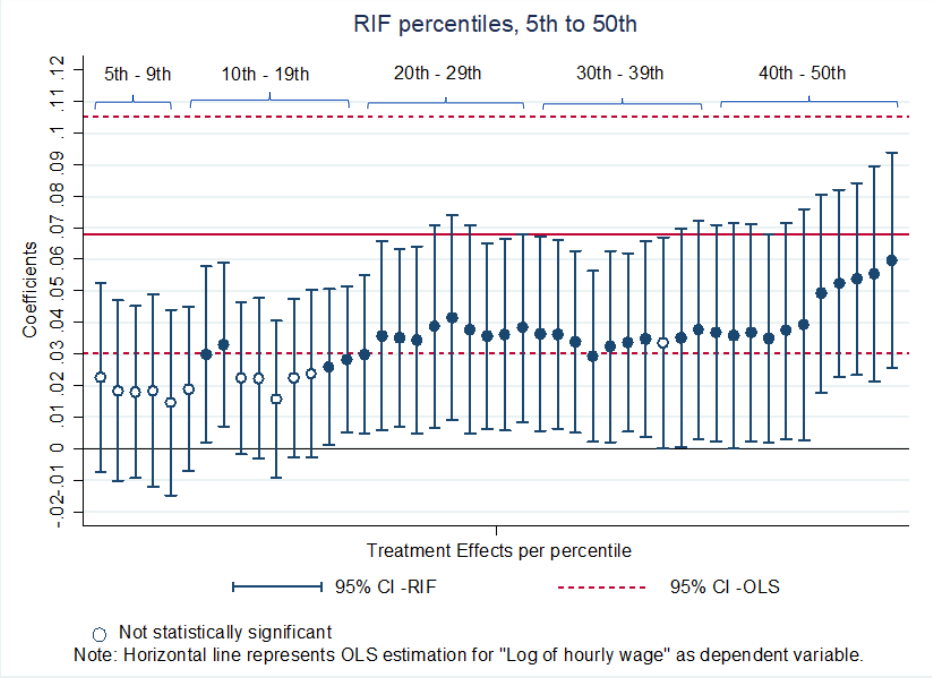


Figure 12: Treatment effects on the upper half of the wage distribution in the public sector

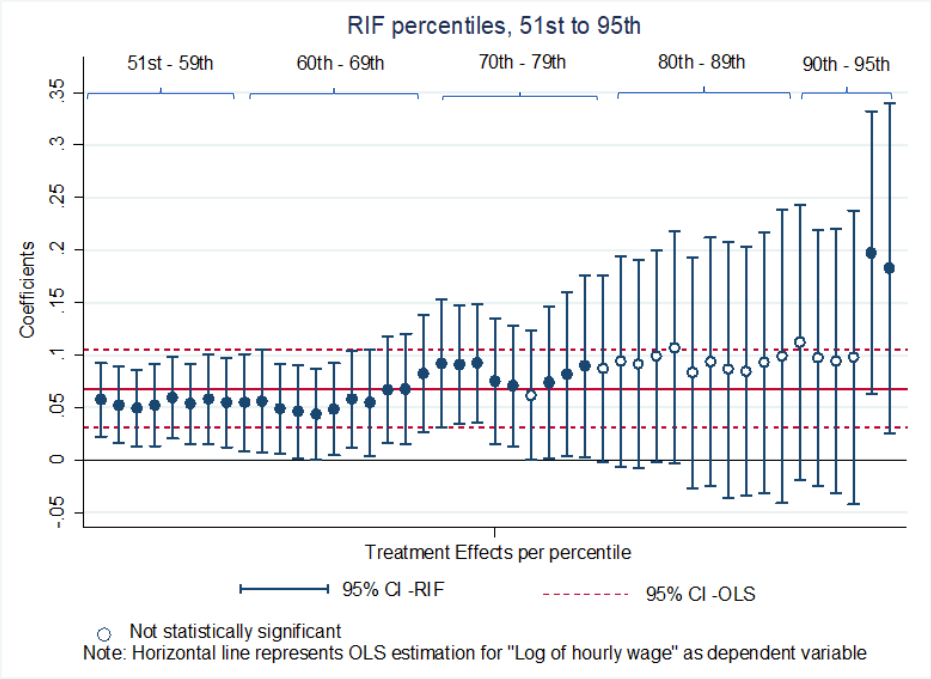


Table 9: Unconditional estimates in the public sector for selected percentiles

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log hourly wage	RIF-Gini	RIF 10	RIF 25	RIF 50	RIF 75	RIF 90
Treatment effects	0.065***	0.044**	0.019	0.041**	0.058***	0.056	0.102
	(0.018)	(0.021)	(0.013)	(0.017)	(0.018)	(0.032)	(0.062)
Obs.	38,290	38,290	38,290	38,290	38,290	38,290	38,290
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: ** p<0.05, *** p<0.01
The sample is constructed from the 2010-2015 Mexican National Occupations and Employment Survey. Municipality Fixed effects. Standard errors adjusted for 733 clusters at municipality level in parentheses. Model (1) OLS standard estimation.

Overall, the MW policy is not associated with reducing inequality. It raises wages, though this effect is found to be stronger in the public sector. The impacts beyond the median of the wage distribution are higher compared to those generally found in the literature to date (e.g., Autor et al., 2016; Bosch and Manacorda, 2010). This is not entirely implausible, especially for the public sector, which uses the MW as a numeraire for increments in salary payments, although higher spending for skilled public sector labour after the 2008 financial crisis may have coincided with these effects.

8. Conclusions

This paper examines the role of an institutional feature of the Mexican labour market that potentially impacts the wage distribution in the country's formal sector. The 2012 Minimum Wage (MW) policy was introduced as a wage floor system to protect the low-paid, narrow the pay distribution at the bottom end, lessen inequality, and reduce poverty.

The study provides evidence that the MW up-rating in 2012 increased both the average wage and wages across the unconditional hourly wage distribution by comparable amounts over the period from 2010 to 2015. The average effect was over 5%. Although the results of a positive effect on wages are consistent with earlier findings for Mexico, the magnitudes of these effects are found to be larger than in the literature to date and this raises questions regarding the identification strategy used here.

In addition, there is little evidence that the MW affected wage inequality overall. However, there is some evidence that it widened inequality in the public sector. These findings may reflect the role of the MW as numeraire (i.e., the MW is used as a norm for indexing prices to multiples or fractions of the MW such as fines, pensions, extra bonuses, etc.). It is a strong institutional feature in Mexico and it may explain the up-rating effects that resonate across the unconditional distribution. However, a very high degree of re-benchmarking wages, beyond the median of the wage distribution, would not fully explain the effects detected at the top end of the unconditional wage distribution observed. The findings higher up the distribution are somewhat questionable as, for instance, the spill-over effects found by Bosch and Manacorda (2010) between 1989 to 2001 persisted only up to the 60^{th} percentile.

There are likely to be confounders in the labour market that coincided with the introduction of this MW intervention around the time it was implemented. It could explain the magnitude of the estimates obtained and their persistence across the distribution. This was a period of macroeconomic turbulence and real wage decline, and this context may be of some relevance here. In addition, the size of the treated group is large relative to the control group and this may render the treatment group more heterogeneous and prone to the influence of other confounding labour market factors.

Overall, the empirical findings are suggesting that the internal validity of the estimate is likely compromised and that the effects reported are not interpretable as representing the causal effects of the 2012 MW up-rating. An investigation to identify and isolate the putative possible confounders is confined to an agenda for future research for trying to explain and understand the MW effects detected at the top end of the pay distribution in this study. Nevertheless, it has demonstrated how RIF-based methods that exploit quantile and Gini-based regressions can potentially enhance the distributional analysis of MW effects in both developing and developed countries' labour markets.

Finally, a key sub-theme of this research has been that the public sector pay-setting mechanism appears to play some role in raising inequality. The debate about the nature and design of the public sector pay-setting mechanism has been a persistent feature of debate in Mexico since the turn of the 20th century. Thus, further research on the issue of higher public sector wages may be useful for understanding their effects on inequality.

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Appendix A. Supplementary Material

A1 Standard OLS model for the logarithm of hourly wages

$$Log\ hourly\ w_i = \gamma_0 + \ \gamma_1\,(POST12_i)\ + \gamma_2\,(POST12_i * TREAT_i)\ + \gamma_3\,(POST12_i * Misc_i) + \gamma_4\,Public_i + \ \gamma_5\,X_i + \delta_k + \omega_i$$

where the coefficients, $\widehat{\gamma_2}$ and $\widehat{\gamma_4}$, represent the treatment effects due to the MW policy and the participation in the public sector. These estimates are of interest when comparing with the UQ regressions' results. Same covariates, X_i, described in equation (4).

Appendix B. Tables

Table B 1: Mean values of hourly wages by treatment and control groups

Variable	Treatment group	Control group
Log hourly wage	3.28	3.33
10^{th} percentile	2.57	2.65
25^{th} percentile	2.85	2.91
50^{th} percentile	3.19	3.23
75^{th} percentile	3.65	3.69
90^{th} percentile	4.15	4.22
Gini	0.38	0.38
Obs.	126,475	25,094

Source: Mexican National Occupations and Employment Survey (2010-2015).

Table B 2: Mean values of hourly wages for control group before and after the intervention

Variable	Before treatment	After treatment
Log hourly wage	3.38	3.29
10^{th} percentile	2.67	2.63
25^{th} percentile	2.95	2.87
50^{th} percentile	3.28	3.19
75^{th} percentile	3.74	3.64
90^{th} percentile	4.27	4.16
Gini	0.39	0.37
Obs.	12,226	12,868

Source: Mexican National Occupations and Employment Survey (2010-2015).

Table B 3: Summary statistics of the explanatory variables

Variable	Mean	Std. Dev.	Min	Max
Age	36	11.40	15	65
Years of schooling	11.07	3.92	0	24
Urban status	0.69	0.46	0	1
Marital status:				
Married	0.72	0.45	0	1
Divorced	0.04	0.19	0	1
Single	0.24	0.43	0	1
Working in Public sector	0.22	0.41	0	1
Economic sector:				
Agriculture	0.03	0.16	0	1
Commerce	0.17	0.38	0	1
Construction	0.07	0.25	0	1
Manufacturing	0.25	0.43	0	1
Sevices	0.46	0.50	0	1
Mining and energy	0.03	0.18	0	1

Source: Mexican National Occupations and Employment Survey (2010-2015). The total observations are 173,669.

Table B 4: Summary statistics of the explanatory variables by treatment and control groups

	Treatment group				Control group			
Variable	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Age	36	11.38	15	65	36	11.35	15	65
Years of schooling	11.15	3.98	0	24	10.78	3.83	0	24
Urban status	0.69	0.46	0	1	0.57	0.49	0	1
Marital status:								
Married	0.74	0.44	0	1	0.69	0.46	0	1
Divorced	0.03	0.18	0	1	0.04	0.20	0	1
Single	0.23	0.42	0	1	0.27	0.44	0	1
Working in Public sector	0.24	0.43	0	1	0.20	0.40	0	1
Economic sector:								
Agriculture	0.03	0.16	0	1	0.03	0.17	0	1
Commerce	0.17	0.38	0	1	0.17	0.37	0	1
Construction	0.07	0.25	0	1	0.06	0.24	0	1
Manufacturing	0.24	0.43	0	1	0.26	0.44	0	1
Sevices	0.47	0.50	0	1	0.45	0.50	0	1
Mining and energy	0.03	0.18	0	1	0.03	0.16	0	1

Source: Mexican National Occupations and Employment Survey (2010-2015). The observations in the treatment group are 126,475 while there are 25,094 in the control group.

Table B 5: Summary statistics of the covariates by treatment group before and after the policy

	Before treatment				After treatment			
Variable	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Age	36	11.46	15	65	36	11.30	15	65
Years of schooling	11.10	4.05	0	24	11.20	3.90	0	24
Urban status	0.69	0.46	0	1	0.68	0.47	0	1
Marital status:								
Married	0.73	0.44	0	1	0.74	0.44	0	1
Divorced	0.03	0.18	0	1	0.03	0.18	0	1
Single	0.24	0.42	0	1	0.22	0.42	0	1
Working in Public sector	0.26	0.44	0	1	0.22	0.42	0	1
Economic sector:								
Agriculture	0.03	0.16	0	1	0.02	0.15	0	1
Commerce	0.17	0.37	0	1	0.17	0.38	0	1
Construction	0.06	0.25	0	1	0.07	0.25	0	1
Manufacturing	0.23	0.42	0	1	0.25	0.43	0	1
Sevices	0.48	0.50	0	1	0.46	0.50	0	1

Source: Mexican National Occupations and Employment Survey (2010-2015). Total observations 126,475

Table B 6: Summary statistics of covariates by the control group before and after the policy

	Before treatment				After treatment			
Variable	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Age	36	11.44	15	65	36	11.20	15	65
Years of schooling	10.77	3.91	0	24	10.80	3.74	0	24
Urban status	0.63	0.48	0	1	0.52	0.50	0	1
Marital status:								
Married	0.69	0.46	0	1	0.70	0.46	0	1
Divorced	0.04	0.20	0	1	0.04	0.21	0	1
Single	0.27	0.44	0	1	0.26	0.44	0	1
Working in Public sector	0.23	0.42	0	1	0.17	0.38	0	1
Economic sector:								
Agriculture	0.03	0.18	0	1	0.03	0.16	0	1
Commerce	0.17	0.37	0	1	0.17	0.38	0	1
Construction	0.06	0.24	0	1	0.06	0.24	0	1
Manufacturing	0.23	0.42	0	1	0.29	0.45	0	1
Sevices	0.47	0.50	0	1	0.43	0.49	0	1

Source: Mexican National Occupations and Employment Survey (2010-2015). Total observations 25,094

Table B 7: Two-sample t-tests of means of the explanatory variables pre-treatment

Variables (s)	Mean Control	Mean Treated	Diff.	|t|	Pr(|T|>|t|)
lg hourly wages	3.38	3.29	-0.08	16.77	0.0000***
schooling	10.80	11.10	0.30	9.70	0.0000***
age	35.95	36.42	0.48	5.42	0.0000***
age square	1425.93	1458.07	32.14	4.70	0.0000***
urban	0.75	0.69	-0.06	16.08	0.0000***
public sector	0.19	0.26	0.07	20.53	0.0000***
married	0.68	0.73	0.05	14.11	0.0000***
divorced	0.04	0.03	-0.01	4.80	0.0000***
single	0.28	0.24	-0.04	12.67	0.0000***
Construction	0.07	0.06	-0.01	5.15	0.0000***
Manufacturing	0.26	0.23	-0.03	8.90	0.0000***
Commerce	0.17	0.17	0.00	0.19	0.8459
Services	0.44	0.48	0.04	10.87	0.0000***
Agriculture	0.03	0.03	-0.01	5.08	0.0000***
Mining and energy	0.03	0.03	0.01	3.15	0.0000***
Obs.	23,397	62,541			

Total of observations (baseline): 85,938
Notes: *p<0.1, ** p<0.05, *** p<0.01

Table B 8: OLS estimates of the log of hourly wages

	Log of hourly wage		
	(1)	(2)	(3)
Sample	Pooled sample	Private sector	Public sector
Time	-0.090***	-0.090***	-0.087***
	(0.008)	(0.009)	(0.017)
Treatment effects	0.056***	0.050***	0.068***
	(0.010)	(0.011)	(0.019)
Effects on miscellaneous group	0.062***	0.063***	0.076***
	(0.017)	(0.015)	(0.029)
Years of schooling	0.072***	0.066***	0.087***
	(0.001)	(0.001)	(0.001)
Age	0.027***	0.031***	0.025***
	(0.001)	(0.001)	(0.002)
Age squared	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
Urban reside	0.051***	0.050***	0.084***
	(0.015)	(0.014)	(0.026)
Working in Public sector	0.314***		
	(0.009)		
Economic sector			
Construction	0.197***	0.209***	-0.162
	(0.012)	(0.012)	(0.152)
Commerce	-0.140***	-0.125***	-0.426***
	(0.010)	(0.009)	(0.065)
Services	-0.040***	-0.019**	-0.333***
	(0.010)	(0.009)	(0.054)
Agriculture	-0.040***	-0.036***	-0.682***
	(0.013)	(0.012)	(0.131)
Other	0.186***	0.229***	-0.106**
	(0.025)	(0.029)	(0.043)
Marital status			
Married	0.051***	0.067***	0.006
	(0.008)	(0.009)	(0.014)
Single	-0.012	-0.004	-0.013
	(0.008)	(0.010)	(0.015)
Constant	1.750***	1.754***	2.073***
	(0.024)	(0.030)	(0.059)
Obs.	173,669	135,379	38,290

Notes: ** p<0.05, *** p<0.01
The sample is constructed from the 2010-2015 Mexican National Occupations and Employment Survey. Municipality Fixed effects. Standard errors adjusted at municipality level in parentheses.

Table B 9: Unconditional quantile estimates for selected percentiles

	(1) RIF 10	(2) RIF 25	(3) RIF 50	(4) RIF 75	(5) RIF 90
Time	-0.058***	-0.079***	-0.083***	-0.087***	-0.119***
	(0.010)	(0.014)	(0.016)	(0.013)	(0.020)
Treatment effects	0.033***	0.050***	0.057***	0.063***	0.055**
	(0.012)	(0.015)	(0.017)	(0.016)	(0.023)
Public sector	0.218***	0.218***	0.303***	0.478***	0.444***
	(0.013)	(0.011)	(0.009)	(0.015)	(0.026)
Effects on miscellaneous group	0.031	0.069***	0.052***	0.060***	0.08
	(0.017)	(0.016)	(0.017)	(0.020)	(0.041)
Years of schooling	0.030***	0.040***	0.064***	0.109***	0.131***
	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)
Age	0.025***	0.035***	0.040***	0.030***	0.005**
	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
Age squared	-0.000***	-0.000***	-0.000***	-0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Urban reside	0.024	0.063***	0.077***	0.066***	0.012
	(0.018)	(0.014)	(0.017)	(0.022)	(0.031)
Economic sector					
Construction	0.141***	0.209***	0.269***	0.237***	0.123***
	(0.014)	(0.015)	(0.016)	(0.019)	(0.020)
Commerce	-0.156***	-0.142***	-0.130***	-0.143***	-0.143***
	(0.011)	(0.012)	(0.013)	(0.012)	(0.014)
Services	-0.142***	-0.066***	0.006	0.012	-0.015
	(0.010)	(0.011)	(0.013)	(0.012)	(0.017)
Agriculture	-0.204***	-0.172***	-0.059***	0.083***	0.153***
	(0.027)	(0.021)	(0.016)	(0.018)	(0.024)
Other	-0.023	0.079***	0.199***	0.339***	0.366***
	(0.016)	(0.016)	(0.020)	(0.036)	(0.076)
Marital status					
Married	0.039***	0.046***	0.059***	0.061***	-0.031
	(0.009)	(0.008)	(0.009)	(0.013)	(0.020)
Single	-0.020*	-0.018**	0.001	0.010	-0.051**
	(0.011)	(0.009)	(0.010)	(0.012)	(0.020)
Constant	1.800***	1.653***	1.483***	1.461***	2.187***
	(0.059)	(0.040)	(0.028)	(0.045)	(0.076)
Obs.	173,669	173,669	173,669	173,669	173,669

Notes: ** p<0.05, *** p<0.01
The sample is constructed from the 2010-2015 Mexican National Occupations and Employment Survey. Municipality Fixed effects. Standard errors adjusted for 780 clusters at municipality level in parentheses.

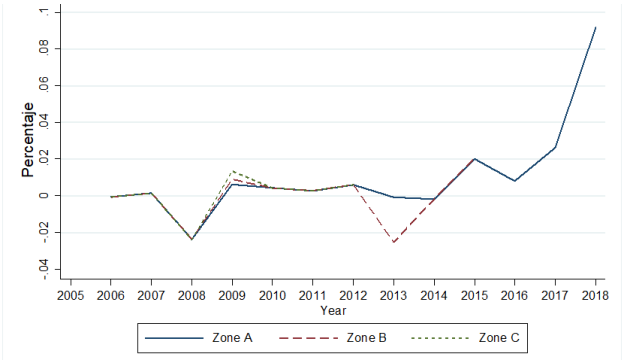
Table B 10: RIF-Gini estimates for unconditional quantiles

	RIF-Gini approach Hourly wage		
	(1)	(2)	(3)
Sample	Pooled sample	Private sector	Public sector
Time	-0.022**	-0.006	-0.078***
	(0.009)	(0.005)	(0.021)
Treatment effects	0.011	0.000	0.044**
	(0.009)	(0.006)	(0.021)
Effects on miscellaneous group	0.017	0.005	0.070
	(0.014)	(0.009)	(0.041)
Years of schooling	0.018***	0.012***	0.037***
	(0.001)	(0.001)	(0.002)
Age	-0.010***	-0.007***	-0.005**
	(0.001)	(0.001)	(0.002)
Age squared	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Urban reside	-0.011	-0.011**	0.005
	(0.007)	(0.005)	(0.017)
Public sector	0.006		
	(0.006)		
Economic sector			
Construction	-0.028***	-0.025***	-0.052
	(0.004)	(0.004)	(0.165)
Commerce	-0.001	0.004	-0.124***
	(0.004)	(0.003)	(0.047)
Services	0.013***	0.027***	-0.062
	(0.004)	(0.003)	(0.042)
Agriculture	0.062***	0.056***	-0.416***
	(0.006)	(0.006)	(0.058)
Other	0.066***	0.039**	0.027
	(0.019)	(0.018)	(0.034)
Marital status			
Married	-0.002	-0.003	-0.003
	(0.006)	(0.005)	(0.012)
Single	-0.011	-0.002	-0.038***
	(0.006)	(0.006)	(0.013)
Constant	0.292***	0.320***	-0.031
	(0.026)	(0.025)	(0.057)
Obs.	173,669	135,379	38,290

Notes: ** p<0.05, *** p<0.01
The sample is constructed from the 2010-2015 Mexican National Occupations and Employment Survey. Municipality Fixed effects. Standard errors adjusted at municipality level in parentheses.

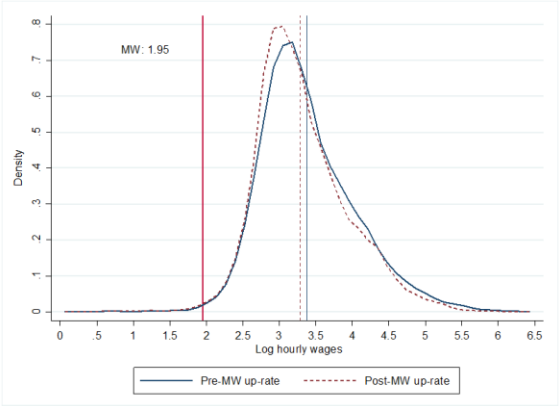
Appendix C. Figures

Figure C1: The growth rate of daily Minimum Wages 2005-2018



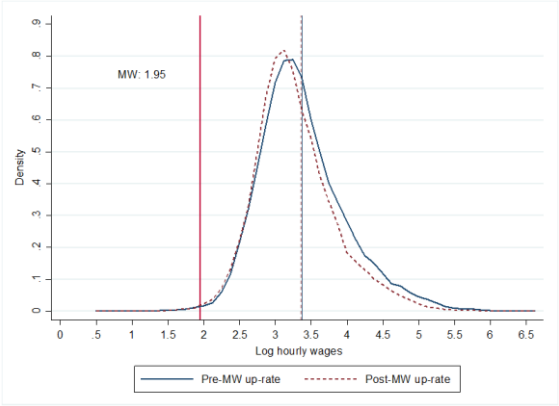
Source: Mexican National Occupations and Employment Survey (2005-2018). Real values 2010 Mexican pesos

Figure C2: Distribution of log hourly wage pre-and post- MW up-rate, Zone A



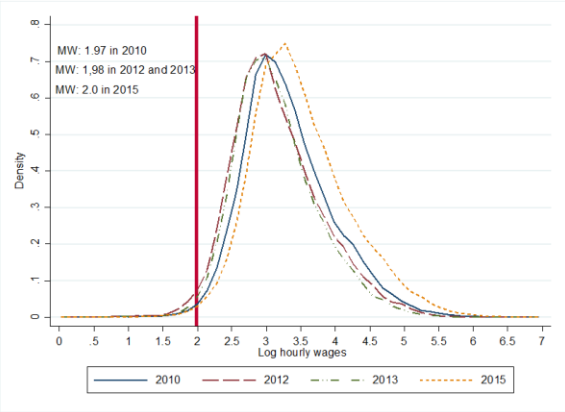
Source: Mexican National Occupations and Employment Survey (2010-2015). Real values at 2010 Mexican pesos.

Figure C3: Distribution of log hourly wage pre-and post- MW up-rate, Zone B



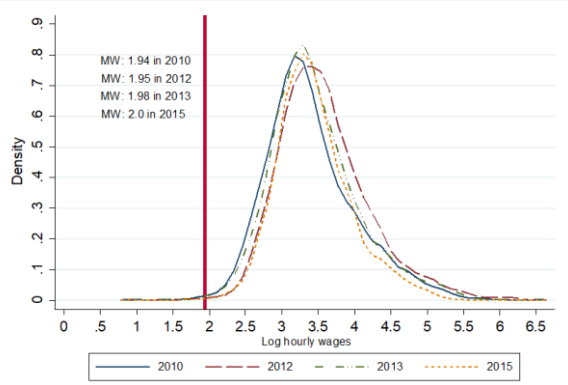
Source: Mexican National Occupations and Employment Survey (2010-2015). Real values at 2010 Mexican pesos.

Figure C4: Distribution of log hourly wage by the control group



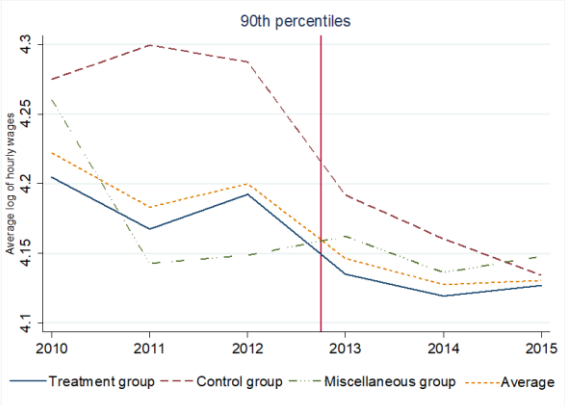
Source: Mexican National Occupations and Employment Survey (2010-2015). Real values at 2010 Mexican pesos. The vertical lines represent the log hourly MW.

Figure C 5: Distribution of log hourly wage for the Miscellaneous group



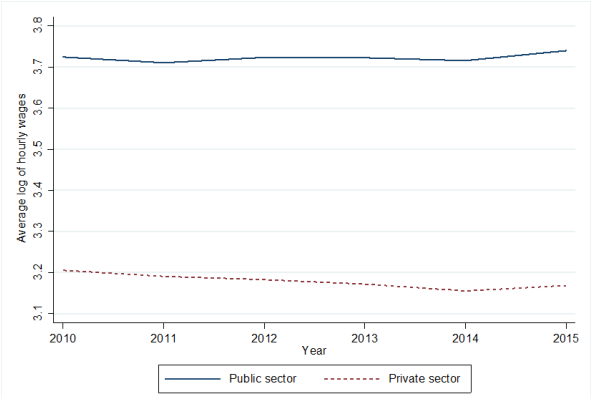
Source: Mexican National Occupations and Employment Survey (2010-2015).

Figure C 6: Trends of the log hourly wages for the 90th percentile by group



Source: Mexican National Occupations and Employment Survey (2010-2015). The vertical line represents the time of the intervention.

Figure C 7: Average of hourly wages by sector



Source: Mexican National Occupations and Employment Survey (2010-2015). Real values in 2010 Mexican pesos.