DOI: http://dx.doi.org/10.22185/24487147.2022.113.24

Effects of the labor market reforms on adolescent employment in Mexico

Efectos de las reformas del mercado laboral en el empleo adolescente en México

Sara Hutchinson-Tovar y Cinthya Guadalupe Caamal-Olvera

Monash University (PhD candidate), Australia y Universidad Autónoma de Nuevo León, México

Abstract

This article analyzes the effect of two labor reforms on youth employment: the single minimum wage zone consolidation and the minimum age to work increased from 14 to 15 years old. Both reforms took place in Mexico in the same year. We examine these changes as a quasi-natural experiment to compare cities that change their minimum wage zone with those that do not. We segregate workers by age into two adolescent groups, the underaged and the legal age to work. The differences-in-differences analysis showed that a higher minimum wage increased employment only for adolescents of legal age to work, while the effect on adolescents underaged was null. The results were not robust when we accounted for a more extended period in a panel data analysis, as there were no effects on employment in any group.

Keywords: Paid work, minimum wage, legal age to work, adolescents, child labor, Mexico.

Resumen

En este artículo se analiza el efecto de dos políticas laborales sobre el empleo adolescente: la consolidación de la zona de salario mínimo único y el incremento en la edad mínima para trabajar de 14 a 15 años. Ambas reformas fueron implementadas en México en el mismo año 2015. Examinaremos estos cambios como un experimento cuasi-natural para comparar a las ciudades que cambiaron la zona de salario mínimo con aquellas que no. Posteriormente separamos a los trabajadores adolescentes según la edad: los que tienen la edad legal para trabajar y los que no. El análisis de diferencias-en-diferencias muestra que un salario mínimo más alto incrementa el empleo solo para los adolescentes con la edad mínima para trabajar; mientras que el efecto es nulo para los jóvenes menores de 15 años. Sin embargo, los resultados no fueron robustos cuando se consideró un periodo de tiempo mayor en el análisis de panel de datos pues no se identificaron los efectos sobre el empleo adolescente.

Palabras clave: Trabajo remunerado, salario mínimo, edad legal para trabajar, adolescentes, trabajo infantil, México.

Introduction

The eradication of child labor in all its forms by 2025 is one of the Sustainable Development Goals of the United Nations Organization (ONU, 2015). However, eliminating child labor does not prohibit those under 18 years old from working. But rather to eradicate labor participation in dangerous and prohibited jobs that put their health, physical and mental development at risk (ILO, 2018) or because they enter the labor market early before they reach the legal minimum age for employment.

The global youth employment trend reflects a decrease in child labor from 16 to 9.6 per cent of working children aged 5 to 17 years old and a drop from 11 to 4.6 per cent in hazardous work from 2000 to 2016 (ILO, 2017). Meanwhile, in Mexico, child labor was reduced by 6.9 to 3.6 per cent in non-permitted occupations of children aged 5 to 14 years. The population in hazardous work, aged 15 to 17 years, decreased from 26.6 to 18.2 per cent, from 2007 to 2017, according to INEGI (2017). These percentages did not change considerably after the Covid-19 pandemic; by the year 2020, in absolute terms, global child labor reached 160 million, while in hazardous jobs were 79 million children (ILO, 2021). In Mexico, the most recent data for 2019 estimates the child labor rate at 7.5 per cent, representing 2.2 million children (INEGI, 2022).

Adolescents work to pay school fees and debts, and because the family needs extra income, these three represent 78.1 per cent of the total reasons to work (INEGI, 2019). Child labor amounts to 3.2 million, representing 11 per cent of the youth population. Some factors contributed to the reduction in child labor, such as the improvement in household conditions (Basu and Van, 1998), the increase in the educational level of the head of the family, the increase in the coverage of social programs, and reductions in the adult unemployment rate (UCW, 2017). The institutional policies to reduce child labor have been concentrated on banning it; however, ignoring the reasons behind the child labor supply can worsen the families' situation (Basu and Van, 1998). Public policies that promoted eliminating the worst forms of child labor (ILO, 2021) or increased the legal minimum age to work (ILO, 2018) reduced child labor.

Nevertheless, law enforceability to promote better child working conditions is hard to accomplish (Orraca, 2014). Fewer studies concentrated on policies that reduce child labor by increasing productivity based on minimum wage (Basu, 2000) or improved income distribution in countries with low productivity (Swinnerton and Rogers, 1999). Minimum wage policies are intended to improve the earnings of low-skill workers and reduce poverty (MaCurdy, 2015). The youngest group would receive low wages due to their lack of experience or abilities relative to the older groups; this group is more likely to be affected by a minimum wage change (Manning, 2021). The effect of minimum wage on child labor is less studied because theoretical ambiguities arose. On the one hand, larger minimum wages reduce the need for extra income, resulting in a drop in child labor. On the other hand, there could be a substitution between young and adult work that, on the contrary, increases child labor (Menon and Rodgers, 2018).

The evidence of the minimum wage changes on U.S. teen employment is vast, mainly finding a null or small but positive effect (Card and Krueger 1995, 2000; Callaway and Sant'Anna, 2021); or finding adverse employment effects (Neumark and Wascher, 1994, 2000;). Others that used better data and methodologies found an elusive effect of the minimum wage on the overall employment (Manning, 2021; Cengiz *et al*., 2019). In the Mexican case, there is a consensus of a null impact on employment (Martínez González, 2020); and positive effects on wages (Campos, Esquivel y Santillán, 2017). During the last thirty years, the minimum wage policy has been almost constant (Martínez González, 2020). Mexican labor market became more flexible after the federal labor reforms in 2012 aimed to reduce the cost of hiring and firing (Mendoza-Cota, 2016). The Mexican labor market was pro-employer because minimum wage increases were constrained during wage negotiations (Bensusán, 2020). Minimum wage effects on child labor have not been analyzed in Mexico. Still, the evidence of the reform of increasing the legal age to work from 14 to 15 explained a reduction of child labor of 16 per cent. At the same time, other policies focused on education, such as the full-time schools' program implemented across Mexican municipalities, reduced child labor by 12 per cent (Kozhaya and Martínez Flores, 2022).

This paper analyzes the effect of two labor reforms that took place in Mexico, and we hypothesized affected child labor. The first policy is the minimum wage increase due to unifying the minimum wage zones. According to Feliciano (1998), the three minimum wage zones policy lasted three decades in Mexico. In 2012, the homologation process began, first compacting zones A and B, which implied an increase in the minimum wage in the cities of zone B, while the nominal minimum wages in zones A and C increased by inflation, as was regularly done. In 2015, the zone unification process consolidated, setting a single nominal minimum wage.

This homologation translated into an absolute increase of 8.5 per cent between 2014 and 2016 for the cities that initially formed the zone with the lowest minimum wage, zone C. The second policy also took place in 2015 when Mexico modified the Federal Labor Law (LFT) by increasing the minimum age to work from 14 to 15 years. With this action, the country ratified Convention 138, which ILO (1973) promoted on the legal minimum age for work (DOF, 2015).

ILO (2018) considers all those under 18 as children; we will focus on the population between 12 and 17 years of age. At the same time, we will distinguish between adolescents from 12 to 14 years old who are legally underage to work and adolescents from 15 to 17 years old. The limitation of this approach is that it does not identify between permitted and dangerous work in adolescents of legal working age. Following the definition of ILO (2018) and the LFT, we defined not permitted work when children are younger than 15 years old, being this, the type of work wishing to eradicate. We hypothesize that both policies reinforce the efforts to reduce child labor in underage youths; regarding teenagers of legal age to work, we expect minimum wage would not affect employment. We propose that the two reforms represent a natural experiment to identify their impact on child labor reduction.

The identification strategy requires the analysis at the city level that changed their minimum wage zone (zone C) against the cities that did not change their minimum wage zone (zone A). The empirical analysis uses the National Occupation and Employment Survey (ENOE), which provides microdata at the individual level to be summarized by the city per year. The methodology of difference-in-differences allows comparing the adolescent work of the treatment group (cities that changed the minimum wage zone) and the control group (cities that did not change the zone), considering a year before the unification (2014) and one year later (2016). The results indicate that after this change, the adolescent employment rate for those between 15 and 17 years of age increased in the cities that changed zones compared to those that did not suffer real increases in the minimum wage. On the contrary, the minimum wage did not change children's participation between 12 and 14 years of age. To test the robustness of the difference-in-differences methodology, we extended the analysis to include data from 2010 to 2017 to identify possible employment changes previous to the two reforms.

We found that the labor reforms analyzed did not affect the employment of underaged adolescents, 12-14 years old, with no legal age to work and whose participation is considered illegal. The empirical results showed that labor policies had a weakly positive effect on youth employment with the legal age; however, the effects are negligible when we use a more extended period. The identification problems arise because the panel data analysis accounts for other changes in the minimum wage zones that started in 2012. Another limitation of the analysis is that the identification of hazardous jobs are only based on age because of the impossibility of identifying dangerous or prohibited labor among adolescents of legal age to work.

The structure of the article is as follows: section 1 reviews the literature on the effect of the minimum wage and child labor; Section 2 presents the descriptive analysis; Section 3 presents the differences-in-differences methodology; Section 4 presents the results of the effect of the minimum wage on adolescent work, Section 5 shows the robustness estimation in a context of panel data analysis. Finally, section 6 explains the conclusions.

Literature Review

Most of the studies on the effect of the minimum wage focus on youth work in the United States. Katz (1973), Mincer (1976), and Swidinsky (1980) found higher adolescent unemployment due to increases in the minimum wage. Later literature by Neumark and Wascher (1994, 2000) confirmed that increases in the minimum wage reduce adolescent and adult employment and that of less-skilled workers in the United States, Neumark, and Wascher (2008). On the contrary, Card, Katz, and Krueger (1994) Card and Krueger (1995, 2000) found no evidence of a negative effect on the adolescent employment rate and even found a positive effect (although not significant) on the employment rate of youth in the United States. Doucouliagos and Stanley (2009), in an analysis of 64 studies for the United States, found little or no evidence of an adverse effect of the minimum wage on employment. Using better data and identification strategies, the overall effect of the minimum wage on employment is elusive (Manning, 2021; Cengiz et al., 2019).

The minimum wage had a heterogeneous effect on employment because of the differences between countries regarding their respective unemployment benefit policies, employment protection programs, and the collective ability to negotiate (Boockmann, 2010). Similarly, Neumark and Wascher (2004), in an analysis for 17 OECD countries, concluded that minimum wage policies on youth employment (between 15 and 24 years old) varied between countries. A meta-analysis of studies published between 1900 and

2020 found a small but negative employment effect in developing countries after accounting for publication bias (Jiménez Martínez and Jiménez Martínez, 2021). The employment protection laws, restrictive labor regulations, and more union coverage contributed to the heterogeneous effect of the minimum wage on unemployment, which seems elusive (Manning, 2021). Recent evidence accounting for heterogenous effects on exposure to treatment found a negative effect on teen employment (Callaway and Sant'Anna, 2021).

The empirical evidence for Mexico had shown that employment was not sensitive to changes in the minimum wage. However, it has impacted the wage distribution, especially in the lower part of the distribution, Bell (1997), Feliciano (1998), Fairris, Popli and Zepeda (2008), Campos Vázquez, Esquivel, and Santillán Hernández (2017), Campos Vázquez and Rodas Milián (2020) and Martínez González (2020). The little employment response might be because the minimum wage changes are anticipated and predicted to be in the same amount of the inflationary rates increases (Martínez González, 2020). Several articles have analyzed child labor in Mexico, such as Alcaraz, Chiquiar, and Salcedo (2012), Orraca (2014), among others, as well as other articles that had analyzed the substitution between adult work and child labor (Doran, 2013). There is evidence of a reduction in child labor after the increase in the legal age to work, implemented in 2015, (Kozhaya and Martínez Flores, 2022). Still, none directly addressed the influence of the minimum wage on child labor or youth employment.

An empirical study by Menon and Rodgers (2018) focused on the effect of the minimum wage distinguishing between the employment of those who do not meet the legal minimum age to work; for the case of India, it did not find a significant effect on work outside home (Menon and Rodgers, 2018). Manacorda and Rosati (2010), for the case of Brazil, found that a higher average salary granted to those under 10 and 15 years of age generated a substitution effect that favored a larger labor supply. Similarly, Duryea and Arends-Kuenning (2003) found a higher participation rate in Brazil in young people aged 14 and 16, which resulted in a positive relationship between adolescent work and less skilled jobs' salaries.

Basu (2000) analysis of the minimum wage on child labor indicated that if this increase were productivity-based, child labor would decline. However, suppose the minimum wage causes unemployment. In that case, child labor increases, possibly displacing adult work, causing a multiplier effect that would increase the child labor supply (Basu, 2000). On the other hand, if the labor market is oligopolistic, child employment would decrease as adult employment increases. Still, if the labor market functions as perfect competition, the effects on child labor are ambiguous (Basu, 1999). Children are substitutes for adult work in low-skilled and informal jobs (Doran, 2013) with lower wages (Basu, 1999). Also, in sectors with little regulation and monitoring of the working conditions (Anker, 2000; Knight, 1980), child labor is less costly for employers, encouraging higher earnings (Radfar *et al*., 2018).

The increase in the minimum wage is a policy commonly used to adjust wages that could reduce poverty (Stigler, 1946). Poverty is why children and adolescents join the labor force (Basu and Van, 1998). Other authors indicate that the minimum wage would redistribute resources since it can improve productivity and boost growth (Freeman, 1996), implying reduced child labor (Edmonds and Pavcnik, 2005). The minimum wage represents a distortion in the economy by increasing labor costs, reducing profits, or increasing prices of the final goods (Lemos, 2008). In this sense, the minimum wage could have the same effect as a value-added tax on products purchased by low-wage consumers (MaCurdy, 2015). It, therefore, can increase child labor since the household would require additional income to buy the basic family basket.

A public policy prohibiting child labor could be so effective that it could eliminate it but exacerbate the situation of families in poverty (Basu and Van, 1998). The recommendations for an effective public policy are to focus on improving the working conditions of parents to cause improvement in their family situation, and they stop sending their children to work (Basu and Van, 1998; Anker, 2000; Basu, 2000; Fotoniata and Moutos, 2013).

Descriptive analysis

We address whether combining minimum wage increases and raising the legal age to work can reduce child labor in Mexico. The empirical strategy is to compare the real minimum wages across the cities that conform to the zones. For this purpose, we will use the National Survey of Occupation and Employment (ENOE). To form comparable units for the analysis, we use the microdata from ENOE to group them at the city level and year to obtain averages. We consider the period 2010 to 2017 to form the panel data analysis. Since ENOE is quarterly data, we used the third quarter of July to September to avoid seasonality problems and short-term disturbances in the labor market.

The data provides variation across Mexican metropolitan areas of the thirty-two states. Since 1986 there have been three minimum wage zones

(Feliciano, 1998). Four cities have always been in zone A: Tijuana (Baja California Norte), La Paz (Baja California Sur), the Metropolitan Area of Mexico City (the State of Mexico and Mexico City), and Acapulco (Guerrero). The other four cities were in zone B: Guadalajara (Jalisco), Monterrey (Nuevo León), Tampico (Tamaulipas), and Hermosillo (Sonora). Finally, the remaining twenty-four cities were in zone C.

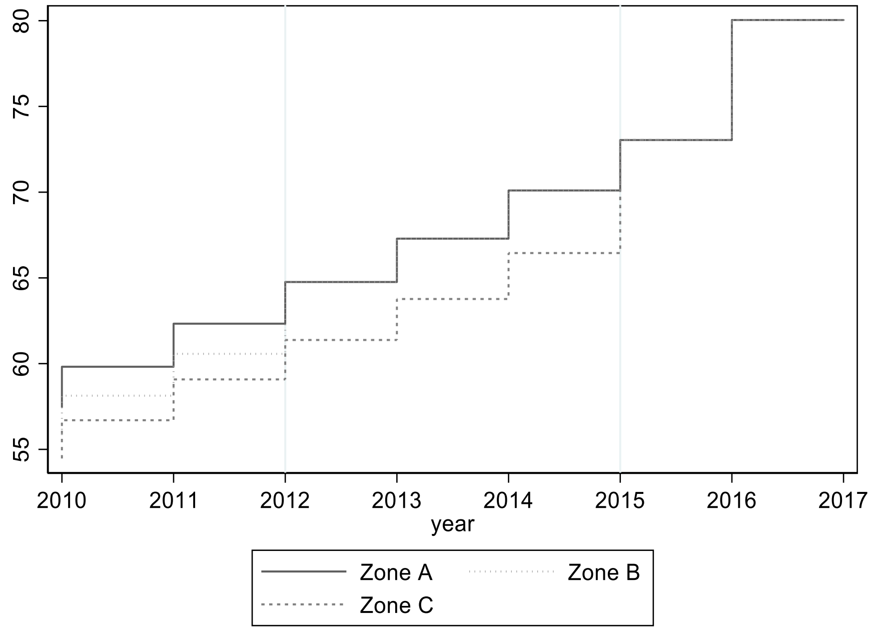
Graph 1 shows the nominal minimum wage evolution across the three zones from 2010 to 2017. Cities in Zone A had the highest minimum wage, while cities in Zone C had the lowest. The nominal minimum wages for 2010 were \$57.46, \$55.84, and \$54.47 per day, respectively (Conasami, 2020); by the end of the period, the minimum wage in the country was 80.04 Mexican pesos. The nominal increase over time was about 40 and 44 per cent. To better assess the purchasing power, we deflated the minimum wage by the National Consumer Price Index (INPC, 2020) of the National Institute of Statistics and Geography (INEGI). Then, the increase in the real minimum wage, from 2010 to 2017, in the cities of Zone A was seven per cent. Meanwhile, zone B increased by ten per cent, and zone C increased by 12 per cent during the analyzed period.

From Graph 1, the most significant increase before 2015 was in zone B because the zone changed in 2012. After 2015, zone C showed the most significant jump observed during the analyzed period. However, the increases in minimum wages occurred every year for all zones, although zone C showed the largest increase, bigger than the change in 2012 in zone B.

The policy of increasing the minimum wage may have pushed wages up in the lowest part of the distribution (Bell, 1997; Feliciano (1998), Fairris, Popli, and Zepeda (2008), Campos Vázquez, Esquivel, and Santillán Hernández, 2017; Campos Vázquez and Rodas Milián, 2020; and Martínez González, 2020). Graph 2 shows the share of workers according to their monthly wage relative to the minimum. The proportion of workers with wages below the minimum followed a constant trend below 10, which increased after 2015. Similarly, the proportion of workers earning between one and two minimum wages showed an increasing and almost parallel trend among zones. In zone A, a larger proportion of workers earn wages below minimum wage than other zones.

There are two main descriptive observations. The first one is that Graph 2 shows pre-trends on the share of workers before 2015, which can complicate the analysis over time. The issue would be other factors contributing to the movements we observe in the data.

Graph 1: Evolution of the nominal daily minimum wage

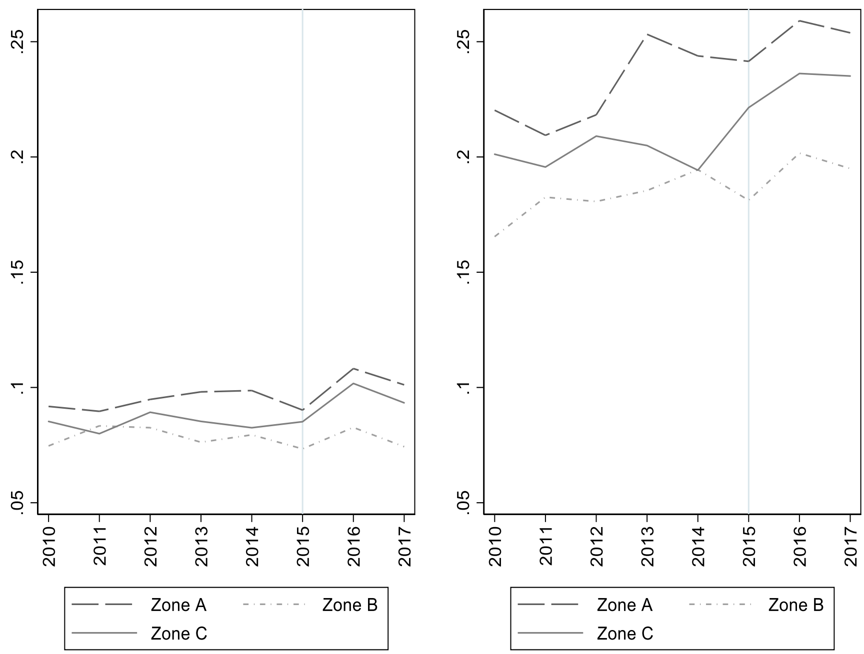


Source: The daily minimum wage is published in January of each year by Conasami (2020).

The second observation is that after 2015 the zones' shares moved alike. To compare the size of the changes, Table 1 shows the time and zone differences along with the minimum wage distribution for workers earning less than a minimum wage, between one and two, two and three, and so on. The third, fourth, and fifth columns show the time differences for each zone, and then, in columns sixth and seventh, we calculated the time difference relative to zone A, which is the group whose four cities did not change. In general, the differences are small and almost negligible. Although, the simple time differences showed an increase in the percentage of workers earning less than a minimum wage. In zone C, the percentage of workers earning less than the minimum increased more than in zone A, a slight positive difference of 0.0097. In zone B, relative to zone A, occurred the opposite as there is a negative difference of -0.0063. In zone C, workers earning more than three minimum wages were lower than zone A, with slight negative differences. The increase in the proportion of workers who receive no income was the smallest in zone C relative to A, with a positive difference of 0.0003, while zone B increased 0.0035 more than zone A.

Graph 2: Share of workers earning wages:

a) Less than one minimum wage b) Between 1 and 2 minimum wages



Source: Own calculations based on the ENOE 2010-2017. Shares are obtained by averaging the cities in each zone. The vertical lines in 2012 and 2015 show changes in the minimum wage zones.

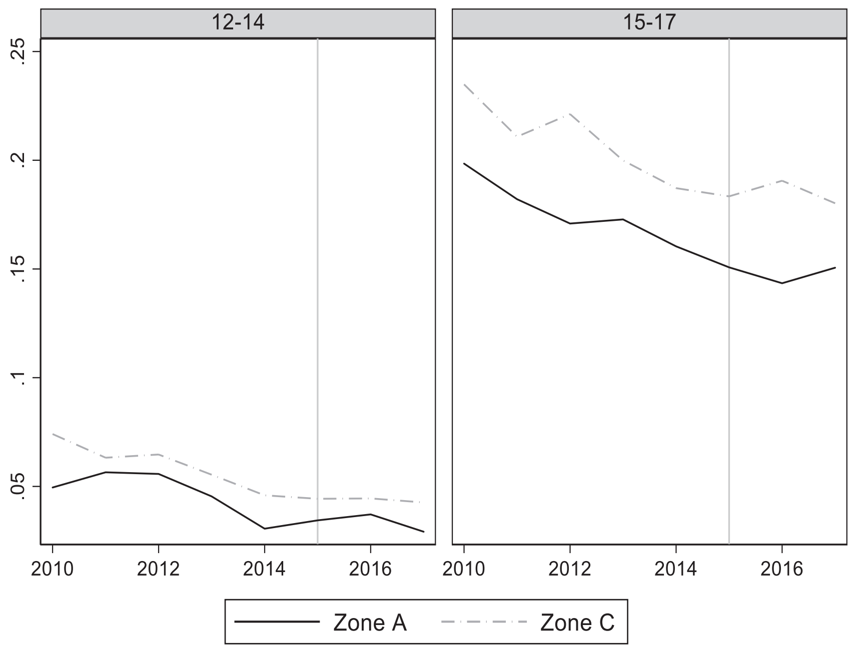
Table 1 shows no significant differences or movements among the share of workers by their wage relative to the minimum. Therefore, to assess the evolution of youth employment in zones A and C, without combining it with wages, we disaggregate the data into two groups of adolescents, as shown in Graph 3. The adolescent workers, who do not have the minimum age to work, 12 to 14 years, show substantially lower working rates than the adolescents with legal age to work, 15 to 17 years old. There is also a declining trend in adolescent employment, consistent with child labor reduction. However, there is an increase in employment of the 15-17 adolescents after 2015 in zone C, while the youngest group seems to follow a constant trend relative to zone A.

Table 1: Share of adolescent workers' differences by minimum wage bins

Minimum wage (mw) bins	Time and zone differences			Differences-in-differences	
	Zone A	Zone B	Zone C	Zone B *vs* Zone A	Zone C *vs* Zone A
< 1 mw	0.0095	0.0032	0.0192	-0.0063	0.0097
1-2 mw	0.0152	0.0072	0.0419	-0.0081	0.0267
2-3 mw	-0.0065	0.0042	-0.0100	0.0107	-0.0036
3-5 mw	-0.0227	-0.0192	-0.0276	0.0035	-0.0050
> = 5 mw	0.0041	-0.0013	-0.0231	-0.0054	-0.0272
No income	-0.0043	-0.0008	-0.0040	0.0035	0.0003

Source: Own calculations based on the ENOE 2010-2017.

Graph 3: Adolescent employment rate by age groups



Source: Own calculations based on the ENOE 2010-2017. The adolescent employment rate is the proportion of workers between 12 and 14 years old and 15 to 17 years old that belong to the EAP for the adolescent population for each age group. The vertical line was in 2015 when minimum wage zones were unified, and the minimum age to work.increased.

Methodology

The proposed methodology identifies the differences in adolescent employment between Zone A and Zone C, focusing on the change when the unique minimum wage zones consolidated in 2015. A quasi-natural experiment entails defining a control group (cities that were not subject to any change in zoning), as is the case of zone A. However, it is necessary to specify that only the four cities that have always been Zone A. Cities of Zone B are not in the control group. Zone C is the treatment group and corresponds to the cities that in 2011 belonged to Zone C, in 2012 were renamed Zone B, and in 2015 were added to Zone A.

The total change in adolescent employment in the cities of Zone C, $D_{ia} = 1$, is denoted as $DE_{i,1}$, where i corresponds to the *i-th* city of Zone C, and where the change in average adolescent employment after 2015, E_{ia}, and average adolescent employment before zone unification, E_{ib}, is:

$$\Delta E_{i,1} = [E_{ia} - E_{ib} \mid D_{ia} = 1] \quad (1)$$

The difference between adolescent employment before and after the minimum wage unification for the cities where the minimum wage did not change, $D_{ia} = 0$, that is, Zone A:

$$\Delta E_{i,0} = [E_{ia} - E_{ib} \mid D_{ia} = 0] \quad (2)$$

The difference-in-differences (DiD) measure is precisely the difference between equations (1) and (2), in such a way that the estimator is:

$$\alpha = [E_{ia} - E_{ib} \mid D_{ia} = 1] - [E_{ia} - E_{ib} \mid D_{ia} = 0] \quad (3)$$

In this sense, the adolescent employment rate is:

$$E_{it} = + \varnothing_i + \delta_t + X_{it}\beta_j + D_{it}\alpha + \boldsymbol{\varepsilon}_{it} \quad (4)$$

The dependent variable, E_{it}, is the percentage of adolescent workers whose age is in the range of 12 to 17 years. Additionally, we will separate by age groups, with the legal age to work, 15 to 17 years, and underage or illegal work, 12 to 14 years. The subscript t indicates the year of the unification of minimum wage zones, which occurred in 2015. The subscript i indicates the two types of minimum wage zone, A (control) and C (treatment). The coefficient α in equation (4) is the parameter of interest DiD, and it is the interaction of the constant term by city according to the minimum wage zone, $\varnothing_i$ and the time trend, δ_t.

Results

The results of the difference-in-differences estimation are shown in Table 2, considering the adolescent employment rate for the economically active population between 12 and 17 years old as the dependent variable. The difference-in-difference (DiD) is estimated in panel data with random effects, as the Hausmann test evidenced no systematic differences with fixed effects.

The DiD coefficients compare changes in Zone C relative to Zone A before (2014) and after the unification (2016). The DiD results show positive and statistically significant coefficients in five out of the seven models estimated, mainly because the DiD coefficient became insignificant when including age groups. Results show a negative time trend in adolescent employment, consistent with Graph 3. At the same time, the effect is not apparent between the control and treatment groups, as there are positive and negative coefficients across models.

Adolescent employment increases if the real hourly income increases. However, the effect was significant in three of the five models. Consistent with Manacorda and Rosati (2010), higher wage increases the incentive to participate in labor. Although the hours worked per week were not statistically significant in any model. By gender, there are no statistically significant gender differences in adolescents' employment. On the formality, there is no conclusive evidence.

The variables controlling the local labor market indicate that the adolescent employment rate increases if the proportion of workers who do not receive income increases, consistent with Ray (2000).

The coefficients are in the range of 0.798 and 1.199 and are statistically significant. If the general unemployment rate increases, the adolescent employment rate also increases, between 0.822 and 1.083. On the contrary, if the percentage of remunerated and subordinate workers increases, the adolescent employment rate reduces in the range of -0.736 and -1.112. This result could be a factor related to the family effects, as income family is the reason for child labor (Basu and Van, 1998).

The movement of a higher salary and number of hours worked would indicate that the movement is on the supply curve of adolescent labor. However, the inclusion of the age groups eliminated the statistical significance of the DiD effect and the effect of the real hourly wage; while considering the coefficient with the highest magnitude of all the variables considered corresponds to the 15 to 17 age group.

Table 2: Results on Adolescent employement 12 to 17 years old

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
DiD (α)	0.0103*	0.0200***	0.0205***	0.0126*	0.0193***	0.00878	0.00846
	(0.00569)	(0.00452)	(0.00575)	(0.00702)	(0.00492)	(0.00603)	(0.00593)
Time (δ_t)	-0.00678	-0.0163**	-0.0230***	-0.00660	-0.0155*	-0.00739	-0.00673
	(0.00692)	(0.00793)	(0.00520)	(0.00796)	(0.00803)	(0.00834)	(0.00826)
Treatment $Ø_i$	-0.00351	-0.00187	0.000101	-0.00968	-0.00685	0.00625	0.00640
	(0.00981)	(0.0139)	(0.0109)	(0.0128)	(0.0137)	(0.0134)	(0.0128)
Earn less than	-0.0677	-0.248	-0.213	-0.202	-0.194	-0.180	-0.183
Min wage	(0.131)	(0.180)	(0.192)	(0.183)	(0.183)	(0.139)	(0.139)
No income	1.199***	0.798**	0.825**	1.012***	0.948***	1.083**	1.053**
	(0.314)	(0.400)	(0.357)	(0.326)	(0.346)	(0.481)	(0.491)
Subordinate	-0.869***	-0.917***	-0.775***	-0.818***	-0.736***	-1.099***	-1.112***
and paid workers	(0.180)	(0.146)	(0.194)	(0.171)	(0.173)	(0.134)	(0.128)
Unemployment	0.740	0.822*		1.015*	1.011**	1.363***	1.350***
	(0.479)	(0.499)		(0.558)	(0.484)	(0.268)	(0.253)
Men		-0.262	-0.0336	-0.496	-0.392	0.117	0.114
		(0.567)	(0.590)	(0.600)	(0.565)	(0.402)	(0.396)
Formality		-0.164	-0.159**	-0.0550	-0.103	-0.0872	-0.0903
		(0.102)	(0.0783)	(0.0738)	(0.0789)	(0.107)	(0.111)
Hourly Wage		0.000963**	0.00103**		0.00103**	0.000264	0.000211
		(0.000463)	(0.000467)		(0.000449)	(0.000551)	(0.000560)
Working hours			0.00120	0.00636	0.00701	0.000701	
per week			(0.00678)	(0.00645)	(0.00664)	(0.00615)	
pop.12-14						0.189	0.187
						(0.618)	(0.610)
pop.15-17						2.007***	2.033***
						(0.725)	(0.707)
pop.26-35						-0.322	-0.356
						(0.523)	(0.523)
pop.36-65						0.423	0.389
						(0.321)	(0.316)
pop. 66+						0.549	0.538
						(0.427)	(0.427)
Constant	0.447***	0.679***	0.504	0.599*	0.498	0.200	0.244
	(0.0852)	(0.252)	(0.368)	(0.329)	(0.335)	(0.359)	(0.349)
sigma_u	0.0210	0.0208	0.0209	0.0200	0.0207	0.0182	0.0174
sigma_e	0.0123	0.0107	0.0108	0.0127	0.0110	0.00947	0.00968
rho	0.744	0.790	0.788	0.714	0.779	0.787	0.764
chi2	74.15	137.4	91.04	116.4	148.2	768.3	724.1
Observations	56	56	56	56	56	56	56

Source: Own calculations obtained from ENOE 2014 and 2016. Standard errors clustered by the city are shown in parentheses. Significance of the coefficients * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3 shows the DiD results by separating the youth employment by age groups: 12 to 14 years, adolescents who do not meet the minimum working age, and adolescents aged 15 to 17. Results show that the unification of minimum wage zones reduced work in the 12 to 14 age group. However, the effect is not statistically significant. On the other hand, the effect is positive, statistically significant, and of greater magnitude for adolescents aged 15 to 17 years, compared to Table 2. The time trend coefficient shows a reduction in the adolescent work rate, consistent with Graph 3. The ratification of Convention 138 that increased the minimum age may directly affect adolescent employment of the underaged group, 12 and 14 years, although the effect was not statistically significant.

On the one hand, the treatment effect is also not significant in any age group specification. The formality variable would indicate that, with a higher proportion of formal work, the adolescent employment rate for the two age groups would decrease, with a greater magnitude in the younger age group, 12 to 14 years; however, the effect is not statistically significant.

On the other hand, the proportion of men does not influence the adolescent employment rate for the 15-17 age group; but it is highly significant in the youngest age group, 12 to 14 years old. Another way of interpreting this effect is that the adolescent employment rate of those under 12 to 14 years of age increases if the percentage of women increases, consistent with the results of Ray (2000). This result might be related to the unpaid work performed by women. The effect of wages and hours worked during the week is only statistically significant for the 15-17 age group and not for the 12-14 age group. From this result, we infer an effect on the labor supply as adolescents with the legal age to work show higher wages and longer hours worked.

The adolescent employment rate increases if the proportion of workers who earn below the minimum is reduced or if the proportion of subordinate and paid workers drops. On the contrary, adolescent employment increases if the percentage of workers with no income increases. The magnitudes of the coefficients of the labor market variables are larger in magnitude in the 15-17 age group.

The effects of general unemployment are significant and of greater magnitude for the 15-17 age group compared to the younger age group. If the unemployment rate of 18- and 26 years old increases, the adolescent employment rate of young people between 15- and 17 years old increases, in a range of 1.808 and 1.349, respectively.

Table 3: Results on Adolescent Work 12 to 14 years vs. 15 to 17 years old

	Teenage employment 12 to 14 years			Teenage employment 15 to 17 years		
		Unemployment 18+	Unemployment 26+	General Unemployment	Unemployment 18+	Unemployment 26+
DiD (α)	-0.00258	-0.00245	-0.00237	0.0365***	0.0366***	0.0355***
	(0.00715)	(0.00715)	(0.00706)	(0.00781)	(0.00836)	(0.00929)
Time (δ_t)	0.00946	0.00882	0.00681	-0.0345***	-0.0351***	-0.0396***
	(0.00728)	(0.00708)	(0.00664)	(0.0102)	(0.0106)	(0.00864)
Treatment $Ø_i$	-0.00563	-0.00528	-0.00411	-0.0122	-0.0118	-0.00878
	(0.0121)	(0.0118)	(0.0110)	(0.0224)	(0.0221)	(0.0214)
Men	-0.635**	-0.621**	-0.529*	-0.494	-0.507	-0.253
	(0.277)	(0.275)	(0.306)	(1.085)	(1.087)	(1.160)
Formality	-0.0882	-0.0903	-0.0960	-0.0354	-0.0354	-0.0396
	(0.0595)	(0.0600)	(0.0602)	(0.129)	(0.129)	(0.122)
Earn less than	-0.297**	-0.298**	-0.294**	-0.0269	-0.0251	0.00239
Minimum wage	(0.126)	(0.129)	(0.135)	(0.274)	(0.280)	(0.286)
No income	0.711**	0.704**	0.691**	1.407***	1.390***	1.367**
	(0.343)	(0.341)	(0.333)	(0.536)	(0.535)	(0.554)
Subordinate and	-0.675***	-0.686***	-0.684***	-0.793***	-0.828***	-0.815***
paid workers	(0.154)	(0.156)	(0.160)	(0.258)	(0.266)	(0.293)
Working	-0.00424	-0.00463	-0.00562	0.0211**	0.0206**	0.0175*
hours	(0.00559)	(0.00572)	(0.00621)	(0.00894)	(0.00916)	(0.0100)
Hourly	-0.000197	-0.000206	-0.000206	0.00206***	0.00203***	0.00187**
Wage	(0.000527)	(0.000511)	(0.000477)	(0.000637)	(0.000656)	(0.000732)
General	0.579*			2.004***		
Unemployment	(0.302)			(0.687)		
Unemployment		0.464*			1.808***	
Over 18		(0.263)			(0.617)	
Unemployment			0.279			1.349**
Over 26			(0.343)			(0.563)
Constant	0.754***	0.762***	0.745***	0.286	0.318	0.273
	(0.228)	(0.231)	(0.241)	(0.592)	(0.603)	(0.636)
sigma_u	0.0155	0.0156	0.0158	0.0289	0.0295	0.0297
sigma_e	0.0113	0.0113	0.0112	0.0157	0.0158	0.0167
rho	0.654	0.657	0.664	0.771	0.778	0.759
chi2	64.83	62.41	52.25	181.5	161.7	122.1
Observations	56	56	56	56	56	56

Source: Own calculations obtained from ENOE 2014 and 2016. Standard errors clustered by the city are shown in parentheses. Significance of the coefficients * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Consistent with the results from Basu (2000), Manacorda and Rosati (2010), and Doran (2013). Although, unemployment is less closely related to the 12-14 age group.

Finally, when comparing the proportion of variation explained by the city-specific term, rho, it is estimated that it is higher in the models where 15 to 17-year-old adolescents are considered, compared to the younger age group.

Robustness Analysis

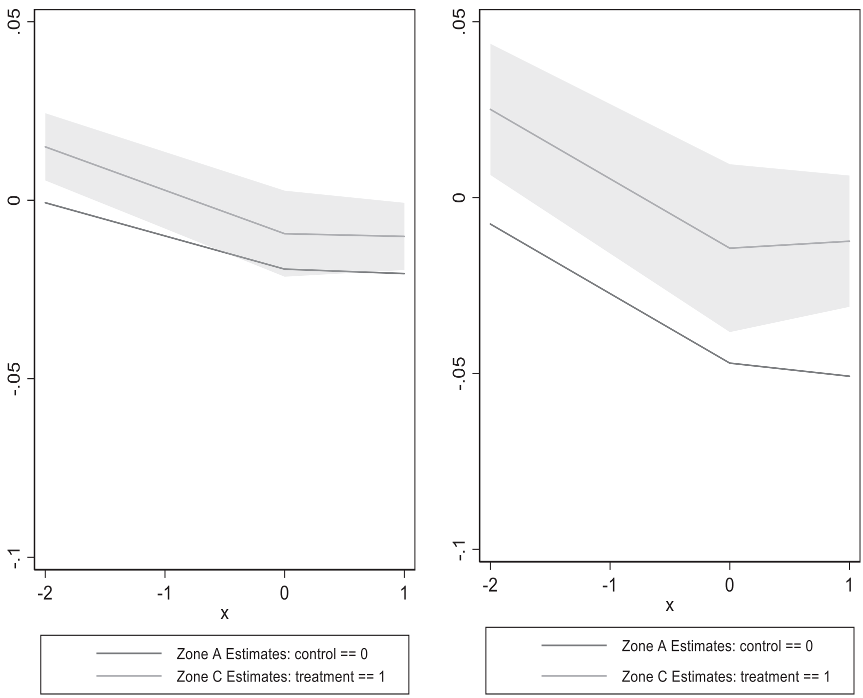
The critical identification assumption is that, in the absence of the intervention, the trend in the adolescent employment rate is similar between the control and treatment groups, and only after treatment would it be a change in the common trend. In other words, both groups must have a parallel trend before the change. If the cities that conform to each minimum wage zone were randomly assigned, the trend between the two groups would be similar (Rosenbaum and Rubin, 1983). Then, the differences between groups would be estimated without bias. However, allocating the minimum wage area to each city could be a non-random process. In this case, there would be systematic differences, such as self-selection in treatment, Abadie (2005).

First, we hypothesized that the differences in the adolescents' employment rates are due to the unification of the minimum wage zones. Although, we need to test the effect of the policy of increasing the minimum working age from 14 to 15 years, implemented in 2015. Following the discussion by Angrist and Pischke (2009) regarding the validity of applying differences-in-differences, we will test the assumption of parallel trends between the groups. For this purpose, we will extend the analysis from 2010 to 2017, allowing us to have periods before and after the intervention. The effects are estimated by age groups from 12 to 14 years, who do not have the legal minimum age to work, and adolescents from 15 to 17 years.

Graph 4 shows the evolution of the adolescent employment rate. We used the variables included in the model 7 from Table 3; we added interactions between the treatment variable with fixed effects from 2010 to 2014, before the unification of zones. Then, we test the hypothesis of joint equality in the coefficients of the interactions. The joint test results of the coefficients showed a test value of F (7, 91) = 0.72, with a p-value of 0.6566. The interpretation of joint coefficients is not statistically significant and provides evidence of no pre-trends nor previous effects causing the observed adolescents' employment change.

Graph 4: The trend of Adolescent Work According to Age Groups

Panel (a). Adolescents 12 to 14 years Panel (b). Adolescents 15 to 17 years



Source: Own calculations of ENOE 2010-2017. Event study considering the base year 2015 (x = 0). The shaded area represents the interval with 95% confidence in the treatment group. The Control group only considers the cities of Zone A, and the treatment group is the cities of Zone C.

Graph 4 shows the treatment and control groups' trends by age group. Comparing by age groups, the trend is not entirely parallel for the 12 to 14 age group, which may result from the change in the law on the legal minimum age to work that increased from 14 to 15 years, precisely in 2015. However, the trend seems parallel for the 15 to 17 age group.

The second exercise of robustness is to estimate the same models of Table 3 using the city panel data from 2010 to 2017. The caveat of applying more than two periods in a panel data context is the presence of serial autocorrelation that makes standard errors inconsistent, as Bertrand, Duflo, and Mullainathan (2004). One solution is to collapse all the periods before and after the policies. For this purpose, we will do two ways of estimation.

Table 4: Panel data analysis of the youth employment changes 2010-2017

	Teenage employment 12 to 14 years			Teenage employment 15 to 17 years		
		Unemployment 18+	Unemployment 26+	General Unemployment	Unemployment 18+	Unemployment 26+
DiD (δ_t) (α)	-0.00174	-0.00110	0.0000737	0.00501	0.00648	0.00807
	(0.00727)	(0.00707)	(0.00652)	(0.0105)	(0.0104)	(0.0101)
Time (δ_t)	-0.00373	-0.00561	-0.00915	-0.0150	-0.0190*	-0.0265**
	(0.00690)	(0.00672)	(0.00650)	(0.0106)	(0.0106)	(0.0103)
Treatment $Ø_i$	0.00165	0.00161	0.00177	-0.00513	-0.00545	-0.00578
	(0.00800)	(0.00797)	(0.00782)	(0.0158)	(0.0163)	(0.0177)
General	0.396**			1.635***		
Unemployment	(0.193)			(0.390)		
Unemployment		0.231			1.248***	
Over 18		(0.175)			(0.360)	
Unemployment			-0.0596			0.865**
Over 26			(0.210)			(0.342)
chi2	177.1	174.6	166.5	542.6	605.3	650.8
Observations	196	196	196	196	196	196

Source: Own calculations obtained from ENOE using panel data from 2010 to 2017 with random effects, the year 2015 is excluded from the analysis as it is when the two policies took place. Standard errors clustered by the city are shown in parentheses. Significance of the coefficients * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Models are the same as in Table 3 since there was no change in the direction of the coefficients.

Table 5: Difference-in-difference collapse panel data analysis of the youth employment

	Teenage employment 12 to 14 years			Teenage employment 15 to 17 years		
		Unemployment 18+	Unemployment 26+	General Unemplo-yment	Unemployment 18+	Unemployment 26+
DiD (α)	-0.00402	-0.00367	-0.00337	0.0108	0.0116	0.0116
	(0.00880)	(0.00863)	(0.00808)	(0.0114)	(0.0116)	(0.0119)
Time (δ_t)	-0.00160	-0.00322	-0.00583	-0.0194	-0.0227^{**}	-0.0289^{***}
	(0.00986)	(0.00955)	(0.00835)	(0.0119)	(0.0113)	(0.0110)
Treatment $Ø_i$	0.00499	0.00550	0.00614	0.00132	0.00211	0.00386
	(0.00899)	(0.00889)	(0.00878)	(0.0198)	(0.0197)	(0.0196)
General	0.577			1.745^{**}		
Unemployment	(0.352)			(0.752)		
Unemployment		0.426			1.421^{**}	
Over 18		(0.314)			(0.643)	
Unemployment			0.297			1.250^{*}
Over 26			(0.326)			(0.726)
chi2	167.3	167.7	168.5	479.7	489.3	559.2
Observations	56	56	56	56	56	56

Source: Own calculations obtained from ENOE using a panel data 2010 to 2017 with random effects and collapsing the periods before (2010-2014) and after (2016-2017), the year 2015 is excluded from the analysis as it is the time where the two policies took place. Standard errors clustered by the city are shown in parentheses. Significance of the coefficients * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Models are the same as Table 3 since there was no change in the direction of the coefficients.

First, we build a dummy variable that indicates cero for 2010 to 2014, leaving out the year of the change, 2015, and the period after 2016 and 2017; the results are shown in Table 4. In the second exercise, we will collapse the periods in two, as shown in Table 5 and as suggested by Bertrand *et al*. (2004).

Table 4 does not show other independent variables as the models presented in Table 3, as the direction of the coefficients did not change. The relevant result is that the DiD coefficients were not statistically significant, which implies that the labor policies did not affect adolescents' employment when applying panel data with time dummies.

Table 5 shows an equivalent exercise by collapsing the years of the analysis into before and after periods. Adolescents younger than 15 years old seem to increase in Zone C relative to Zone A after the change and reduce to adolescents older than 15. However, similarly to Table 4, the results confirm that the labor policies implemented in 2015 reduced child labor and increased youth legal employment. The coefficients are statistically not significant, which means that policies did not have any effect on the adolescent employment. Analyzing time trend, it is found that employment reduction was statistically significant for the group with legal age to work accounting unemployment. However, comparing control and treatment groups, employment of adolescents 12-14 years increased while it dropped for those with legal age to work. However, none of these effects resulted statistically significant.

Conclusions

Two labor policies were implemented in 2015, setting a single minimum wage and increasing the legal age to work. Consequently, the minimum wage increased in real terms by 8.5 per cent in the cities with the lowest minimum wage. The results showed that the combination of both policies caused a reduction in child labor performed by workers younger than 15 years old. On the contrary, there is an apparent increase in adolescent employment of those of legal age for work. However, the robustness tests showed that we have to be careful with the evidence found, as with the panel data analysis the effects on adolescent employment vanished for both groups of teenagers. The analysis limitation is the existence of pre-trends caused by previous changes in the minimum wage policy that started in 2012.

Regarding other factors related to youth employment, we infer that a higher rate of general unemployment and unemployment of those over 18 years of age is associated with an increase in adolescents' employment, consistent with what Basu (2000) found, and Manacorda and Rosati (2010). On the other hand, a higher real hourly wage encourages an increase in the adolescent employment of people aged 15 to 17 years. Nonetheless, this effect is not observed in the younger age group, which showed a more significant increase in the work rate when the proportion of women increased, and with a rise in the percentage of unpaid workers. This effect could be related to the fact that girls mainly perform unpaid work.

Although the labor policies show no effect on adolescent employment, the recommendation is to be cautious with increases in the minimum wage. Adolescents of legal age to work do not respond to any interventions. Policies were ineffective in reducing child labor, as the work rate of adolescents aged 12 to 14 did not change after implementing the policies. One explanation could be that the increase in the minimum working age could have offset the adverse effects of the minimum wage on the work of adolescents who do not have the legal minimum working age. It is important to note that policies are more effective in the first years of their implementation and have a lesser influence later as the monitoring intensity decreases. We can conclude that the Mexican labor market is rigid to accommodate reform changes in youth employment. The explanations are due to low minimum wages with anticipated increases tied to the inflation rate that occurred when the policymakers kept moderate increases in the minimum wage. From the results, we inferred that labor policies expected to have a reduction in child labor appear ineffective. Monitoring strategies and enforceability of the labor conditions on youth employment might reduce child labor; providing more employment opportunities and better wages for adults can also reduce child labor.

References

Abadie, Alberto, 2005, "Semiparametric Difference-in-Differences Estimators", in *The Review of Economic Studies*, Vol. 72, No. 1, pp. 1–19. Available in https://doi.org/10.1111/0034-6527.00321.

Angrist, J. D. and Pischke, J.S., 2009, *Mostly harmless econometrics: An empiricist's companion*. Princeton University Press.

Anker, R., 2000, *Conceptual and research frameworks for the economics of child labour and its elimination*. ILO/Working Paper 993467523402676, International Labour Organization. Available in https://www.ilo.org/global/publications/working-papers/WCMS_840332/lang--en/index.htm

Alcaraz, Carlo, Chiquiar, Daniel y Salcedo, Alejandrina, 2012, "Remittances, schooling, and child labor in Mexico", *Journal of Development Economics,* Volume 97, Issue 1, pp. 156-165. Available in https://doi.org/10.1016/j.jdeveco.2010.11.004.

Basu, Kaushik, 1999, "Child Labor: Cause, Consequence, and Cure, with Remarks on International Labor Standards", in *Journal of Economics Literature*. Vol. 37, No. 3, pp. 1083-1119. Available in https://doi.org/10.1257/jel.37.3.1083

Basu, Kaushik, 2000, "The Intriguing Relation between Adult Minimum Wage and Child Labour", in *The Economic Journal*, Vol. 110, pp. 50–61. Available in https://doi.org/10.1111/1468-0297.00520

Basu, Kaushik, and Pham Hoang Van, 1998, "The Economics of Child Labor", in *The American Economic Review*, vol. 88, no. 3, 1998, pp. 412–427. Available in http://www.jstor.org/stable/116842

Bell, L. A., 1997, "The Impact of Minimum Wages in Mexico and Colombia", in *Journal of Labor Economics*, 15(3): 102-135. Available in https://doi.org/10.1086/209878

Bensusán, G., 2020*, The Transformation of the Mexican Labour Regulation Model and its link to North American Economic Integration*, ILO Working Paper 15 (Geneva, ILO). Available in https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms_761839.pdf

Bertrand, Marianne, Duflo, Esther y Mullainathan, Sendhil, 2004, "How Much Should We Trust Differences-In-Differences Estimates? ", in *The Quarterly Journal of Economics*, Volume 119, Issue 1, February 2004, Pages 249–275, Available in https://doi.org/10.1162/003355304772839588

Boockmann, B., 2010, *The combined employment effects of minimum wages and labor market regulation: A meta-analysis*. Discussion Paper Series IZA DP No. 4983. Available in https://www.iza.org/publications/dp/4983/the-combined-employment-effects-of-minimum-wages-and-labor-market-regulation-a-meta-analysis

Callaway, Brantly and Sant'Anna, Pedro H.C., 2021, "Difference-in-Differences with multiple time periods", in *Journal of Econometrics*, Vol. 225, Issue 2, pp. 200-230. Available in https://doi.org/10.1016/j.jeconom.2020.12.001.

Campos Vázquez, R. M., Esquivel, G., and Santillán Hernández, A. S., 2017, "The Impact of the Minimum Wage on Income and Employment in Mexico", in *CEPAL Review*, 122, 189–216. Available in https://doi.org/10.18356/d81adc80-en

Campos Vázquez, Raymundo Miguel y Rodas Milián, James Alexis, 2020, "El efecto faro del salario mínimo en la estructura salarial: evidencias para México", en *El Trimestre Económico*. vol. 87 (1), núm. 345, pp. 51-97. Disponible en https://doi.org/10.20430/ete.v87i345.859

Card, David, Lawrence Katz, F. and Krueger, Alan B., 1994, Comment on David Neumark and William Wascher, "Employment Effects of Minimum and Subminimum Wages: Panel Data on State Minimum Wage Laws", in *ILR Review*, 47(3), 487–497. Available in https://doi.org/10.1177/001979399404700308

Card, David and Krueger, Alan B., 1995, *Myth and measurement: the new economics of the minimum wage*. Princeton, Nueva Jersey, Princeton University Press.

Card, David and Krueger, Alan B., 2000, "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania: Reply", in *American Economic Review*, Vol 90, No. 5, pp. 1397-1420. Available in https://doi.org/10.1257/aer.90.5.1397

Cengiz, Doruk, Arindrajit Dube, Lindner, Attila and Zipperer, Ben, 2019, "The Effect of Minimum Wages on Low-Wage Jobs", in *The Quarterly Journal of Economics*, vol. 134, issue 3, 1405-1454. Available in https://doi.org/10.1093/qje/qjz014

CONASAMI, 2020, *Tabla de Salarios Mínimos Generales y Profesionales por Áreas Geográficas 1992 – 2020*. México. Disponible en https://www.gob.mx/conasami/documentos/tabla-de-salarios-minimos-generales-y-profesionales-por-areas-geograficas?idiom=es

DOF, 2015, *DECRETO por el que se reforman y derogan diversas disposiciones de la Ley Federal del Trabajo, en materia de trabajo de menores*. DOF: 12/06/2015. Disponible en https://www.dof.gob.mx/nota_detalle.php?codigo=5396526&fecha=12/06/2015

Doran, Kirk B., 2013, "How Does Child Labor Affect the Demand for Adult Labor? Evidence from Rural Mexico", in *Journal of Human Resources*, Vol. 48, No. 3, pp. 702-735. Available in https://doi.org/10.3368/jhr.48.3.702

Doucouliagos, H. and T.D., Stanley, 2009, "Publication Selection Bias in Minimum-Wage Research? A Meta-Regression Analysis", in *British Journal of Industrial Relations*, Vol. 47, pp. 406-428. Available in https://doi.org/10.1111/j.1467-8543.2009.00723.x

Duryea, S., and Arends-Kuenning, M., 2003, "School Attendance, Child Labor and Local Labor Market Fluctuations in Urban Brazil", in *World Development,* Vol.31, No.7, 1165-1178. Available in https://doi.org/10.1016/S0305-750X(03)00065-2

Edmonds, E. V., and, N., Pavcnik, 2005, "Child Labor in the Global Economy", in *The Journal of Economic Perspectives,* Vol.19, No.1, pp. 199-220. Available in https://doi.org/10.1257/0895330053147895

Fairris, D., Popli, G., and Zepeda, E., 2008, "Minimum Wages and the Wage Structure in Mexico", in *Review of Social Economy*, Vol. 66, No. 2, pp. 181-208. Available in https://doi.org/10.1080/00346760701691489

Feliciano, Zadia M., 1998, "Does the Minimum Wage Affect Employment in Mexico?", in *Eastern Economic Journal*, Vol. 24, No. 2, pp. 165-180. Available in https://www.jstor.org/stable/40325835

Fotoniata, Eugenia and Moutos, Thomas, 2013, "Product Quality, Informality, and Child Labor", in *Review of Development Economics*, Vol. 17, No. 2, pp. 268–283. Available in https://doi.org/10.1111/rode.12031

Freeman, Richard B., 1996, "The Minimum Wage as a Redistributive Tool", in *Economic Journal, Vol.* 106, No. 436, pp. 639-649. Available in https://doi.org/10.2307/2235571

INEGI, 2017, *Módulo de Trabajo Infantil, MTI 2017*. Principales resultados. Instituto Nacional de Estadística y Geografía, INEGI. Disponible en https://www.inegi.org.mx/contenidos/programas/mti/2017/doc/mti2017_resultados.pdf

INEGI, 2019, *Estadísticas a propósito del día mundial contra el trabajo infantil (datos nacionales)*. Comunicado de prensa núm. 312/19. 12 de junio de 2019. Instituto Nacional de Estadística y Geografía, INEGI. Disponible en https://www.inegi.org.mx/contenidos/saladeprensa/aproposito/2019/infantil2019_Nal.pdf

INEGI, 2020*, Microdatos de la Encuesta Nacional de Ocupación y Empleo (ENOE)*. Bases de datos 2010-2017. Instituto de Estadística y Geografía (INEGI). México. Disponible en https://www.inegi.org.mx/programas/enoe/15ymas/default.html#Microdatos

INEGI, 2022, *Estadísticas a propósito del día mundial Contra el trabajo infantil*. Comunicado de prensa núm. 322/22 9 de junio de 2022. Disponible en https://www.inegi.org.mx/contenidos/saladeprensa/aproposito/2022/EAP_VsTrabInf.pdf

ILO, 1973, *Ratificación del C138 - Convenio sobre la edad mínima, 1973* (núm. 138). International Labour Organization. Disponible en https://www.ilo.org/dyn/normlex/es/f?p=1000:11300:0::NO:11300:P11300_INSTRUMENT_ID:312283

ILO, 2017, *Global Estimates of Child Labour. Results and Trends, 2012-2016*. International Labour Organization, Geneva. Available in https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_575499.pdf

ILO, 2018, *El convenio Núm. 138 de la OIT de un vistazo*. Organización Internacional del Trabajo. Fascículo, 30 de mayo de 2018. Disponible en https://www.ilo.org/ipec/Informationresources/WCMS_IPEC_PUB_30216/lang--es/index.htm

ILO, 2021, *Child Labour: Global estimates 2020, trends and the road forward*. Report June 2021. International Labour Organization. Available in https://www.ilo.org/ipec/Informationresources/WCMS_797515/lang--en/index.htm?ssSourceSiteId=global

INPC, 2020, Índice Nacional de Precios al Consumidor. Instituto Nacional de Estadística y Geografía (INEGI), México. Disponible en https://www.inegi.org.mx/temas/inpc/

Jiménez Martínez Mónica, and Jiménez Martínez, Maribel, 2021, "Are the effects of minimum wage on the labour market the same across countries? A meta-analysis spanning a century", in *Economic Systems*, Volume 45, Issue 1, 100849. Available in https://doi.org/10.1016/j.ecosys.2020.100849

Katz, A., 1973, "Teenage Employment Effects of State Minimum Wages", in *The Journal of Human Resources*, Vol.8, No.2, pp. 250-256. Available in https://doi.org/10.2307/144739

Knight, William J., 1980, *The World's Exploited Children: Growing up Sadly.* Washington, D.C.: U.S. Department of Labor, Bureau of International Labor Affairs. U.S. Department of Labor Monograph No. 4. Available in https://eric.ed.gov/?id=ED188791

Kozhaya, Mireille and Martínez Flores, Fernanda, 2022, "School attendance and child labor: Evidence from Mexico's Full-Time School program", in *Economics of Education Review*, Volume 90, 102294. Available in https://doi.org/10.1016/j.econedurev.2022.102294

Lemos, Sara, 2008, "A survey of the effects of the minimum wage on prices", in *Journal of Economic Surveys,* Vol. 22, No. 1, pp. 187–212. Available in http://dx.doi.org/10.1111/j.1467-6419.2007.00532.x

Manacorda, M. and Rosati, F., 2010, "Local labor demand and child work", in *Research in Labor Economics,* Vol. 31, pp.321-354. Available in https://doi.org/10.1108/S0147-9121(2010)0000031014

MaCurdy, Thomas, 2015, "How effective is the minimum wage at supporting the poor?", in *Journal of Political Economy*, Vol. 123, No. 2, pp. 497–545. Available in https://doi.org/10.1086/679626

Manning, Alan, 2021, "The Elusive Employment Effect of the Minimum Wage", in *The Journal of Economic Perspectives*, Vol. 35, No. 1, pp. 3-26. Available in https://doi.org/10.1257/jep.35.1.3

Martínez González, Gabriel, 2020, "Effect on employment of minimum wages in Mexico", in *Análisis económico*, Vol. 35, No. 89, pp. 9-35. Available in https://doi.org/10.24275/uam/azc/dcsh/ae/2020v35n89/Martinez

Mendoza-Cota, E., 2016, "Labor flexibility and regional unemployment in Mexico: a panel cointegration analysis", in *Economía Sociedad y Territorio*, Vol. 17, No. 53, pp. 35-62. Available in https://doi.org/10.22136/est000689

Menon, Nidhiya, and van der Meulen Rodgers, Yana, 2018, "Child Labor and the Minimum Wage: Evidence from India", in *Journal of Comparative Economics*, Vol. 46, No. 2, pp. 480–94. Available in https://doi.org/10.1016/j.jce.2017.09.001

Neumark, David and Wascher, William, 1994, "Employment Effects of Minimum and Subminimum Wages: Reply to Card, Katz, and Krueger", in *Industrial and Labor Relations Review*, Vol. 47, No. 3, pp. 497-512. Available in https://doi.org/10.1177/001979399404700309

Neumark, David and Wascher, William, 2000, "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania: Comment", in *The American Economic Review,* Vol. 90, No. 5, pp. 1362-1396. Available in https://doi.org/10.1257/aer.90.5.1362

Neumark, David and Wascher, William, 2008, *Minimum Wages*, MIT Press, Cambridge, Massachusetts.

ONU, 2015*, Resolución aprobada por la Asamblea General el 25 de septiembre de 2015*. Asamblea general. Septuagésimo período de sesiones Temas 15 y 116 del programa. Naciones Unidas, A/RES/70/1. Disponible en https://unctad.org/system/files/official-document/ares70d1_es.pdf

Orraca, Pedro, 2014, “El trabajo infantil en México y sus causas”, en *Revista Problemas del Desarrollo*, Vol. 178, No. 45, pp. 113-137. Disponible en https://doi.org/10.1016/S0301-7036(14)70878-8

Radfar, A., Asgharzadeh, S., Quesada, F., & Filip, I., 2018, “Challenges and perspectives of child labor”, in *Industrial psychiatry journal*, Vol. 27, No. 1, pp. 17–20. Available in https://doi.org/10.4103/ipj.ipj_105_14

Ray, R., 2000, “Child Labor, Child Schooling, and Their Interaction with Adult Labor: Empirical Evidence for Peru and Pakistan”, in *The World Bank Economic Review*, Vol.14, No. 2, 347-367. Available in https://doi.org/10.1093/wber/14.2.347

Rosenbaum, P., and Rubin, D., 1983, “The Central Role of the Propensity Score in Observational Studies for Causal Effects”, in *Biometrika,* Vol. 70, No.1, pp. 41-55. Available in https://doi.org/10.2307/2335942

Stigler, George J., 1946, “The economics of the minimum wage legislation”, in *American Economic Review,* Vol, 36, No. 3, pp. 358-365. Available in https://www.jstor.org/stable/1801842

Swinnerton, Kenneth A. and Rogers, Carol Ann, 1999, “The Economics of Child Labor: Comment”, in *American Economic Review*, Vol. 89, No. 5, pp. 1382-85. Available in https://doi.org/10.1257/aer.89.5.1382

Swidinsky, R., 1980, “Minimum Wages and Teenage Unemployment”, in *The Canadian Journal of Economics,* Vol.13, No.1, 158-171. Available in https://doi.org/10.2307/134629

UCW, 2017, *Understanding trends in child labour*. A joint ILO-UNICEF-The World Bank report. UCW Working Paper Series, November. Available in http://www.ucw-project.org/research-papers-details.aspx?id=12424&Pag=1&Year=-1&Country=-1&Author=-1

Resumen curricular de las autoras

Sara Hutchinson Tovar

Es egresada de la carrera de Licenciado en Economía, Facultad de Economía, Universidad Autónoma de Nuevo León (UANL). Su tesis originó la idea principal del artículo, misma que fue premiada como primer lugar en el Premio Consuelo Meyer a la mejor tesis de licenciatura en el año 2018 de la Facultad de Economía, UANL. Además, su tesis de licenciatura fue seleccionada para el programa Understanding Children´s Work (UCW), que es una iniciativa de cooperación de investigación entre organismos que involucra a la Organización Internacional del Trabajo (OIT), UNICEF y el Banco Mundial. Actualmente se desempeña en el Banco de México, delegación Jalisco.
Dirección electrónica: shutchinsont@banxico.org.mx

Cinthya Guadalupe Caamal-Olvera

Es doctora y maestra en Economía por la Universidad de Essex, Reino Unido y Licenciada en Economía por la Facultad de Economía de la Universidad Autónoma de Nuevo León (UANL). Es profesora de tiempo completo en la UANL desde enero de 2009 a la fecha. Fue directora del Centro de Investigaciones Económicas 2013-2016, y editora de Ensayos en la *Revista de Economía* 2010-2013, actualmente es editora asociada. Fue coordinadora de investigación del programa Understanding Children´s Work (UCW) con la UANL, una iniciativa de cooperación en investigación interinstitucional que involucraba a la OIT, UNICEF y el Banco Mundial durante 2014-2018. Es miembro del Sistema Nacional de Investigadores de México (SNI nivel I) del Consejo Nacional de Ciencia y Tecnología (Conacyt) y tiene reconocimiento al Perfil deseable otorgado por la Secretaría de Educación.

Dirección electrónica: cinthya.caamallv@uanl.edu.mx
Registro ORCID: https://orcid.org/0000-0003-0249-4027

Artículo recibido el 27 de noviembre de 2021 y aceptado el 4 de junio de 2022