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Abstract

Minimum wage (MW) policies are widespread in the developing world and yet their effects are still unclear. In this paper we explore the effect of national MW policies in Latin America's six largest economies by exploiting the heterogeneity in how binding minimum wages are across local labor markets and over time. We find evidence that the MW has a compression effect on the wage distribution of formal workers. The effect was particularly large during the 2000s, a decade of sustained growth and strong labor markets. In contrast, the effect seems to vanish in the 2010s, a decade of much weaker labor markets. We also find suggestive evidence of a lighthouse effect: the MW seems to have an unequalizing effect also on the wage distribution of informal workers.

JEL Classification: J22, J31, J38, K31.
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1 Introduction

The minimum wage (MW) is one of the main policy instruments aimed at affecting labor market outcomes by increasing real wages in the lower tail of the distribution and hence reducing wage inequality. To what extent this instrument is capable of these goals is the subject of a large debate both in the policy arena and in the academic literature.

The issue is particularly relevant in Latin America, where minimum wages are key components of the policy strategies seeking to reduce endemic high inequality levels. In particular, the increase in the MW has been singled out as a relevant factor accounting for the substantial reduction in income inequality experienced by Latin American countries during the 2000s.

In this paper we explore the effect of the MW on the wage distributions of the six largest economies in Latin America over the last two decades. In particular, we exploit the heterogeneity in how binding minimum wages are across local labor markets and over time. To that aim we use harmonized microdata from the national household surveys of Argentina, Brazil, Chile, Colombia, Mexico and Peru, which represent 79 per cent of total population and 86 per cent of total GDP in Latin America.

Our identification strategy lies on the fact that differences in local labor markets earnings distributions imply heterogeneity in the binding nature of the nationally-set minimum wage. We follow the framework initially proposed by Lee (1999) and define the effective minimum wage (EMW) as the difference between the (log) statutory national MW and the (log) wage of a reference percentile high enough such that it is not affected by the policy. The EMW is then a measure of the biteness of the national MW in each local labor market: it reflects the different exposure of each region to changes in the statutory national minimum wage. We then regress the wage gap (with the reference percentile) at different percentiles against the EMW, including controls, non-linear terms and fixed effects. To increase the reliability of our estimates we also follow an instrumental variables approach proposed by Autor et al. (2016) and modified by Engbom and Moser (2021) that considers historical wealth of each region as a predictor of the minimum wage bindingness.

We find evidence that the MW has a compression effect on the wage distribution of formal workers. The effect was particularly large during the 2000s, a decade of sustained growth and strong labor markets. In contrast, the effect seems to vanish in the 2010s, a decade of much weaker labor markets. Our results suggest that the positive effect of the MW on wages is particularly significant for male, middle-skilled workers. We also find some evidence for a "lighthouse effect": the MW seems to have an unequalizing effect also on the wage distribution of informal workers.

Relatively few studies have been undertaken concerning the minimum wage during the boom years, and all of them have been carried out at the national level (see, for example, Maurizio, 2014; Ferreira et al., 2017; Grau et al., 2011; Alves et al., 2012). Our work presents the novelty of carrying out a comprehensive study for the six largest countries in Latin America as a whole.

The rest of the paper is organized as follows. Section 2 provides context on the minimum wage in Latin America. Section 3 details the empirical strategy followed to estimate the effect

of the minimum wage, while Section 4 describes the data used for the analysis. Section 6 shows the main results. In Section 7 we carry out some robustness tests. Finally, Section 8 concludes.

2 Minimum wage and inequality in LA

As in most countries in the world, the minimum wage (MW) is a key policy instrument also in Latin America. MW are set with the aim of increasing wages in the bottom of the distribution, and hence reducing wage inequality. There is considerable heterogeneity across countries in some characteristics of this policy instrument, such as level, frequency and dispersion across groups of workers. While some countries set a uniform minimum wage once a year, others have multiple minimum wages set by industry, region, category, and even educational attainment (e.g. most Central American countries).

In this paper we focus on the six largest economies of Latin America; Argentina, Brazil, Chile, Colombia, Mexico and Peru, which represent 79 per cent of total population and 86 per cent of total GDP in Latin America. In these countries the minimum wage is set annually at the national level.[1] The only exception is Mexico, where the minimum wage was determined in different "minimum wage areas" until October 2015 with the aim of reaching the same level of real minimum wage in each area (we work with the national average minimum wage, for more information see Section 4).

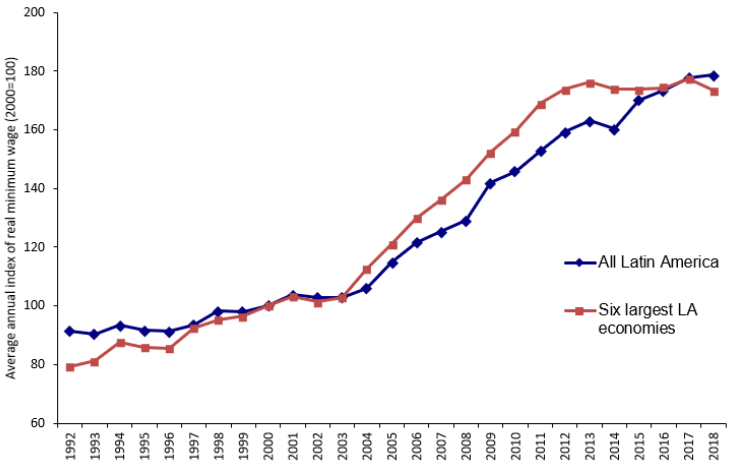
Unlike the United States, where the minimum wage is set on an hourly basis, in almost all of the countries studied in this paper it is set monthly with a legal working time of 40 hours per week, the only exception again being Mexico (where the MW wage is set on a daily basis).[2]

Figure 1 shows the evolution of the minimum wage over the last two decades. After a period of moderate increase in the 1990s, the MW strongly grew over the 2000s, and then turned more erratic in the 2010s. For the case of the whole region, the real minimum wage increased at an annual rate of 1.1% between 1992 and 2003; accelerated to 4.7% a year between 2003 and 2013, and then slowed down to 1.8% a year between 2013 and 2018. Changes were similar, although more dramatic, for the group of the six largest economies. The MW grew at an annual rate of 5.5% between 2003 and 2013 and then remained almost constant in the following years.

[1] In some years for some countries the minimum wage is not defined at the beginning of the year but in the middle of it, so these countries have 2 minimum wage levels in that year. Meanwhile, in other countries there may be more than two minimum wages per year (e.g. in Argentina due to high inflation). We take the annual average of the minimum wage in these cases.

[2] Thus, when working with minimum hourly wages in our paper we are making the assumption that the monthly minimum wage for an 8-hour working day serves as a reference for employers in case their employees work more (or less) than 8 hours per day.

Figure 1: Average minimum wage index across Latin American countries and its 6 largest countries (studied in this paper) 1992-2018

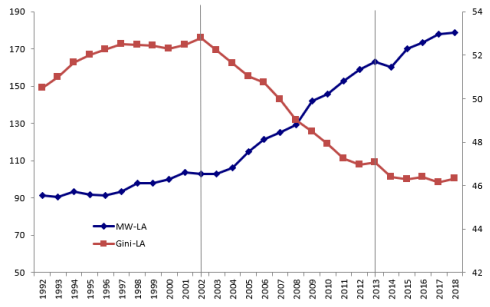


Notes. The countries considered in "All Latin America" group are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. The six largest economies are: Argentina, Brazil, Chile, Colombia, Mexico and Peru.
Source. Own elaboration based on CEPAL.

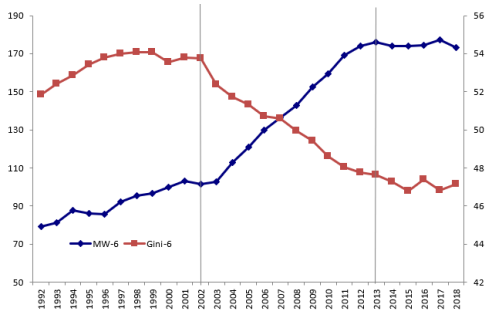
Many analysts and commentators have suggested that the increase in the minimum wage in the 2000s was one of the main drivers of the fall in inequality in Latin America. Just to motivate this issue, Figure 2 shows the evolution of income inequality, as measured by the Gini coefficient. The strong increase in the minimum wage in the 2010s coincides with a substantial fall in inequality. Also, in the 2010s the deceleration in the minimum wage coincides with a slow down in the reduction of inequality. The patterns are similar for the whole region (panel A) and for the six largest economies (panel B). Of course these simple graphs do not prove any relationship between the MW and inequality, but serve as motivation for the rest of the analysis. Is there causal evidence of an equalizing effect of the minimum wage policies over the wage distribution, and ultimately on the income distribution? The rest of the paper tackles these questions, limiting the analysis to the six largest economies in the region. The similarity between panels A and B suggests that the results might be more general than for this sample of six countries.

Figure 2: Evolution of the gini coefficient for Latin America and its 6 largest countries (studied in this paper) 1992-2019

Panel A: All Latin American countries



Panel B: Six largest economies



Notes. The right axis shows values of the Gini coefficient of wage inequality for both graphs. The left axis shows values of the minimum wage index for both panels. The countries considered in "All Latin America" group are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. The six largest economies are: Argentina, Brazil, Chile, Colombia, Mexico and Peru.
Source. Own elaboration based on households surveys microdata from SEDLAC (CEDLAS and The World Bank).

3 Econometric framework and empirical strategy

Although there is a negative correlation between the minimum wage and inequality, this relationship cannot necessarily be interpreted as causal inference, since there may have been, and in fact there were, other macroeconomic trends that affected inequality beyond the minimum wage. We address this possible simultaneity by exploiting the geographic variability that exists in the bite of the minimum wage among different regions over time.

This variability is related to two main factors: i) the existence of a statutory national minimum wage that varies over time; and ii) differences in regional effectiveness of the national minimum wage due to different regional wage distributions.

To study the effect of the minimum wage on the wage distribution, we firstly define the effective minimum wage or Kaitz index, as the difference between the log statutory national minimum wage and the log wage of a percentile high enough such that the pth percentile of the wage distribution is not (directly or indirectly) affected by the minimum wage. In this study, we set the 75th percentile as the reference percentile, so that the EMW is defined by: [3]

$$EMW_{rt} = w_t^{min} - w_{rt}^{p75} \tag{1}$$

[3] In Section 5 we further discuss the choice of the 75th percentile as the reference percentile. In addition, as robustness checks, we have also carried out the analysis using the 50th and the 90th as alternative reference percentiles (other reference percentiles commonly used in the literature), and conclusions are essentially unchanged. For more information, see Section 7.

The EMW is then a measure of the bite of the national minimum wage in each region, and constitutes the main variable of interest in this study, as it reflects the different exposure of each region to changes in the statutory national minimum wage over the sample period. Thus, in this analysis, a higher EMW (or a more binding minimum wage) implies a less negative $wmin - w(p75)$, i.e., a minimum wage that is closer to the $p75$.

In other words, the intuition behind this identification strategy is that differential regional earning structures allow for variability in the minimum wage binding. That is, in those regions that are poorer the statutory national minimum wage will be more binding than in others with higher wage levels, where their wage distribution would not be affected by changes in national minimum wages.

For example, in the wealthy district of Buenos Aires (Argentina), the Effective Minimum Wage shows a very low bite: the wage distribution of this region have a high 75th wage percentile relative to other poorer regions of Argentina (and Latin America). Thus, its EMW is among the lowest (most negative) in the country and continent. On the other hand, in the lower income districts of northern Argentina, for example, the 75th percentile of their regional wage distributions is at a lower level than that of Buenos Aires: this makes their EMW less negative (the Argentine national minimum wage is closer in the wage distribution to their 75th percentile) giving it more bite or effectiveness.

Then, we estimate the following equation:

$$w(p)_{rt} - w(p75)_{rt} = \beta_1(p)EMW_{rt} + \beta_2(p)EMW_{rt}^2 + \sigma_{r0}(p) + \sigma_{r1}(p) * t + \gamma_t(p) + \epsilon_{rt}(p) \quad (2)$$

Where $w(p)_{rt} - w(p75)_{rt}$ represents the gap between the log real wage at percentile p and the log real wage at percentile 75th, in region r and year t. Time invariant region effects are represented by σ_{r0}. $\sigma_{r1} * t$ represent region-specific trends. γ_t captures time variability (typically year fixed effects or quadratic time trends); while ϵ_{rt} are errors clustered at the region level.

We are particularly interested in the marginal effect of equation 2: $EMW_{rt} + 2\beta_2(p)EMW_{rt}$ as it captures the idea that a change in the minimum wage is likely to have more impact on the wage distribution where it is more binding. Particularly, if the minimum wage were to compress the wage distribution we would expect to find positive coefficients for wage gaps below the reference percentile (a less negative $w(p) - w(p75)$); and negative coefficients above the reference percentile (a less positive $w(p) - w(p75)$).

The literature suggests that these estimates might be biased, mainly by the presence of measurement error or possibly transitory shocks. With this in mind, we instrument the EMW_{rt} and its square with a set of instruments proposed by Autor et al. (2016). However, they are able to work with legal minimum wages defined at the US state level (due to local minimum wage laws), so we follow Engbom and Moser (2021) and adapt the IV strategy to the context of countries without specific regional minimum wages, as is the case with most of Latin American economies. Thus, our 2SLS strategy instruments the effective minimum wage and its square with a set of instruments that combine: (i) the statutory national minimum wage, (ii) its square, and

(iii) the log statutory national minimum wage interacted with the average real log median wage for the region over time. Intuitively, the instrument predicts that regions with higher long-term wage levels have lower EMW, which contributes to identifying the minimum wage´s effects on the wage distribution and satisfies the relevance condition. Following the literature, we assume that legal minimum wages are exogenous to other factors affecting regional wage distributions once we have controlled for region fixed effects and region specific time trends[4]. This implies that the concurrent level of the statutory minimum wage relative to the long-term average income level within a region affects the concurrent wage inequality only through its effect on the concurrent bindingness of the minimum wage. It is expected that changes in the national minimum wage will affect the contemporaneous wage distribution of each region, but will not affect its long-term wealth, after controlling for our set of fixed effects. We understand that this historical level depends on other factors such as the productive structure at the local level, the level of education of individuals in the region, among other conditions and economic endowments specific to each region.

Table A4 of Appendix A shows the results of the first stage of the 2SLS regressions for selected percentiles of regional wage distributions.

In our IV specification, identification in 2 for the linear term in the EMW comes entirely from the variation in the statutory national minimum wage, and identification for the quadratic term comes from the inclusion of the square of the log statutory national minimum wage and the interaction term (the term numbered with (iii) above). Taking this into account, the table shows that the instruments have good predictive power with p-values above 1% statistical significance and the directions of the effects are as expected. Also, the Kleinbergen-Paap F-statistics relatively high and their values are way above the Stock-Yogo weak ID test critical values. Thus, we provide evidence in favor of the empirical strategy followed in this paper.

4 Data

The approach used in this paper uses as the primary variable of interest the percentiles of annual wage distribution for each region of the six largest economies in Latin America. We chose the definition of each country region to obtain similar geographic and administrative aggregation levels. In this regard, we will refer as "regions" to agglomerates in Argentina, states in Brazil, administrative regions in Chile, departments for Colombia, districts for Mexico, and departments in Peru. All these regions represent an intermediate aggregation level, the analog of U.S. states. Since some regions have changed over time, we standardize them for our analysis period. In the cases where such reconstruction was not possible, we did not include those regions in the analysis.

Wage distributions were constructed by pooling all individual responses using microdata from household surveys. Percentiles of wage distribution were calculated using the log real

[4] Since Latin American countries have national minimum wages but, in contrast to the U.S., no state-level minimum wages, we include as controls in our IV specification state-specific quadratic time trends instead of a set of year dummies to control for time invariant shocks.

hourly wage, defined as reported monthly monetary income of the main occupation, adjusted by hours worked. The principal analysis is carried out for full-employed men and women aged between 18 and 60, living in urban areas and registered in social security. In order to reduce the influence of outliers, we winsorized the 3% top and bottom of the wage distribution by assigning the third percentile value to the second and first one; and the ninety-seventh percentiles value to the ninety-eight and ninety-ninth percentiles. Using these individual wage data, we calculate percentiles of regional wage distributions for 2001-2018 (with gaps depending on availability of national household surveys), weighting observations by their sampling weight multiplied by their monthly hours worked.

Regarding the minimum wage data, our main sources of information are ILOSTAT, CEPAL, and data reported by official national statistic institutes. We constructed hourly minimum wages by dividing monthly minimums by 172.8 hours, considering an average weekly workday of 40 hours.[5]

5 Motivating evidence

Prior to applying the empirical strategy, it is important to provide evidence on the variability in the effectiveness of the minimum wage over time and across regions. In this sense, we compute the binding percentiles for each region over the period, where the binding percentile refers to the income percentile in each region at which workers earn wages equal to or above the national minimum wage. Columns 1 and 2 of Table 1 display the lowest and highest percentiles at which the minimum wage binds across all regional distributions, showing that the bindingness of minimum wages differ across regions, as the range over which the binding percentile varies is relatively large.

[5] The value of the minimum wage is usually adjusted annually, although changes can occur at different times of the calendar year. We address this point by using an annual average based on monthly minimum wages.

Table 1: Summary statistics for bindingness of minimum wage

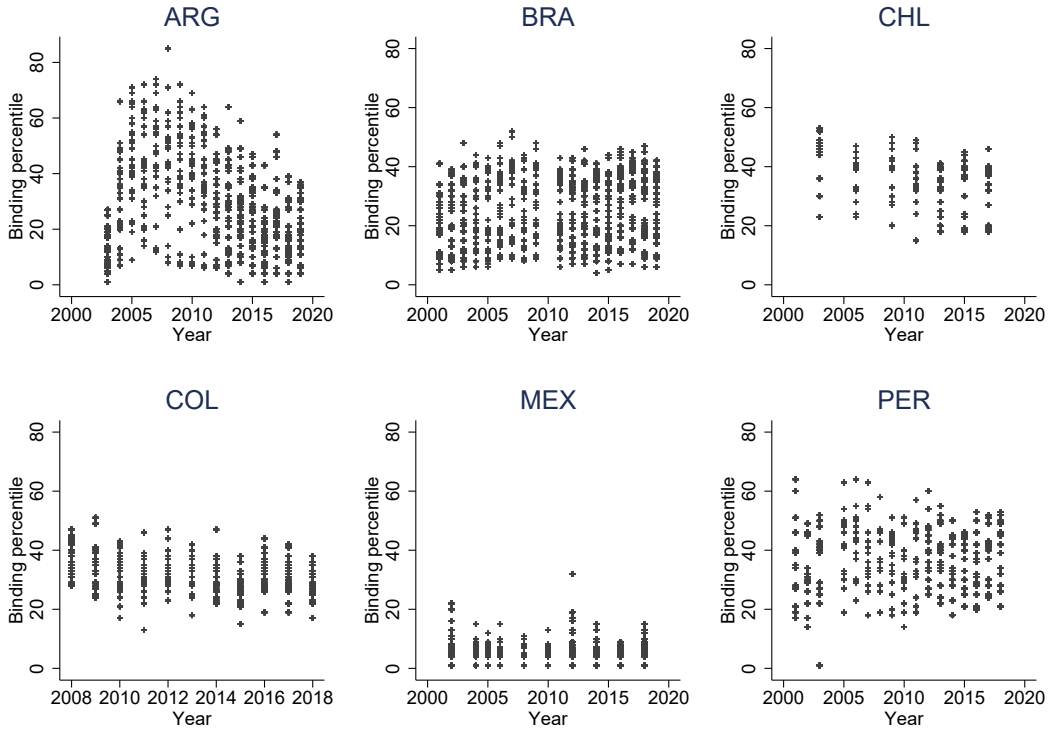
	Minimum binding percentile (1)	Maximum binding percentile (2)	Share of workers below minimum (3)	Share of workers at minimum (4)	Share of workers above minimum (5)
2003	1	53	11.5%	8.4%	79.6%
2004	1	66	11.7%	9.5%	78.6%
2005	1	71	16.2%	12.2%	71.4%
2006	1	72	15.6%	13.3%	70.9%
2007	9	74	15.3%	13.2%	71.4%
2008	1	85	15.7%	15.0%	69.2%
2009	7	72	14.2%	16.0%	69.7%
2010	1	69	13.3%	16.2%	70.3%
2011	6	64	13.4%	16.1%	70.2%
2012	1	60	13.2%	15.9%	70.7%
2013	4	64	12.7%	15.4%	71.8%
2014	1	59	11.3%	15.2%	73.4%
2015	4	47	10.7%	15.7%	73.5%
2016	1	53	10.2%	16.2%	73.6%
2017	4	54	10.9%	17.5%	71.5%
2018	1	53	10.2%	15.6%	74.1%

Notes. Columns 3, 4 and 5 are the unweighted average of national shares. Due to national households surveys availability, Latin American averages were computed for 2003-2018.

Source. Own elaboration based on microdata from SEDLAC (CEDLAS and World Bank).

Figure 3 displays similar information by showing every binding percentile for each country over the period. In addition to supporting the evidence of variability, it can be observed that in several regions the minimum wage level falls on relatively high wage percentiles. This finding motivates the decision to choose the 75th percentile as the reference percentile, since the median seems to be directly affected by the level of the minimum wage, at least for some regions.

Figure 3: Binding percentiles over countries and regions.



Notes. Each point belongs to a region and represents the income percentile in that region at which workers earn wages equal to or above the national minimum wage. *Source.* Own elaboration based on microdata from SEDLAC (CEDLAS and World Bank).

An alternative approach for accounting for the effectiveness of minimum wage is by computing the share of workers earning below, at and above the minimum wage. This information is provided by Columns 3, 4 and 5 of Table 1. Taking into account that the legal minimum wage is established as a gross wage, while earnings declared in household surveys are often net wages and could be miss-reported, we consider a 10% margin to delimit whether an individual's income is below or above the minimum wage. Thus, we define a *below* group that contains those individuals who reported wages below 90% of the nominal value of the minimum wage; an *at* group that includes individuals who reported wages between 90% and 110% of the value of the minimum wage, and finally an *above* group which includes those individuals who reported wages higher than 110% of the value of the minimum wage. Results show that most of formal workers in AL earns more than the minimum wage. However, there is a not insignificant share that earns below the minimum wage, which could be explained by enforcement problems, miss-reporting issues, as well as differences related to the difficulty for distinguishing between net and gross salaries.

Considering the average for Latin America, we observe that the share of workers earning below the minimum wage remained somewhat stable during the period analyzed, ranging between 10% and 15%. The share of workers earning around the minimum wage was 8% at the beginning of the period, and stood at 18% in 2017. The opposite side of this lies in the percentage of workers earning above the minimum wage, whose proportion decreased by 10 pp, implying that wage distribution is more concentrated at levels close to the minimum wage at the end of the period than at the beginning. These observations provide additional evidence of an increase in the effectiveness of the minimum wage in LA during over the period.

Table A1 displays the below, at and above minimum wage groups for each country separately. Beyond the general pattern mentioned above, it is worth mentioning that Mexico shows practically no changes in its composition, where most of its workers earn above the minimum wage throughout the entire period. Chile had a significant reduction in the proportion of workers earning below the minimum wage over the years, while Argentina showed a jump in non-compliance in 2004 and 2005, possibly associated with an abrupt increase in the value of its national minimum wage. Taking into account these heterogeneities may be useful in explaining possible differences in the impacts of minimum wages trough these economies, since the effects this policy may produce in wage inequality is associated not only with the higher wages that workers could earn, but also with the changes that could occur regarding the enforcement and compliance of the minimum wage.

Focusing on those workers earning at the minimum wage, Table 2 displays the composition of this group in terms of gender, education and age. Columns 1 and 2 show that most of this groups are men, although the share of women has increased in the end of the period. At the beginning of the period, half of the workers were medium-skilled workers, while low-skilled workers accounted for 40% and high-skilled workers for the remaining 10%. Although the share of the latter remained unchanged throughout the period, the proportion of medium-skilled workers increased by 10 pp in opposition to low-skilled workers share. In this regard, increases in minimum wage levels could have displaced low-skilled workers from this group, either to the group of formal workers earning below the minimum wage or to informal workers. Regarding age structure, the share of young workers remains relatively stable at around 20% throughout the entire period, except for the first few years. This differs from developed countries, where most of workers earning the minimum wage are young people who have recently entered the labor market. It is reasonable to suppose that in Latin American countries, the entry of those with less experience such as young workers occurs most in the informal market, due to the no-registration high rates in these economies.

Table 2: Summary statistics for workers earning the minimum wage

	Gender		Education			Age	
	Men	Women	Low-skilled	Med-skilled	High-skilled	Young	25-60 years old
2003	66.5%	33.5%	38.1%	52.5%	9.4%	24.8%	75.2%
2004	65.2%	34.8%	37.9%	51.6%	10.5%	22.7%	77.3%
2005	62.8%	37.2%	31.6%	57.2%	11.2%	22.4%	77.6%
2006	63.9%	36.1%	32.7%	53.6%	13.7%	19.4%	80.6%
2007	62.8%	37.2%	29.4%	56.4%	14.2%	21.6%	78.4%
2008	60.9%	39.1%	27.6%	59.7%	12.7%	22.3%	77.7%
2009	61.8%	38.2%	27.9%	60.4%	11.8%	22.5%	77.5%
2010	61.0%	39.0%	28.5%	58.3%	13.2%	22.1%	77.9%
2011	60.6%	39.4%	26.3%	60.6%	13.1%	20.5%	79.5%
2012	61.2%	38.8%	24.0%	63.0%	13.0%	19.4%	80.6%
2013	59.1%	40.9%	23.3%	62.7%	14.0%	19.8%	80.2%
2014	56.6%	43.4%	24.1%	62.7%	13.2%	21.7%	78.3%
2015	56.7%	43.3%	23.2%	63.6%	13.2%	20.8%	79.2%
2016	56.7%	43.3%	22.1%	63.1%	14.8%	19.5%	80.5%
2017	56.9%	43.1%	21.2%	63.8%	15.0%	19.8%	80.2%
2018	57.0%	43.0%	20.8%	64.2%	15.0%	20.4%	79.6%

Notes. Notes. All columns refers to the unweighted average of national shares. Due to households surveys availability, Latin American averages were computed for 2003-2018.

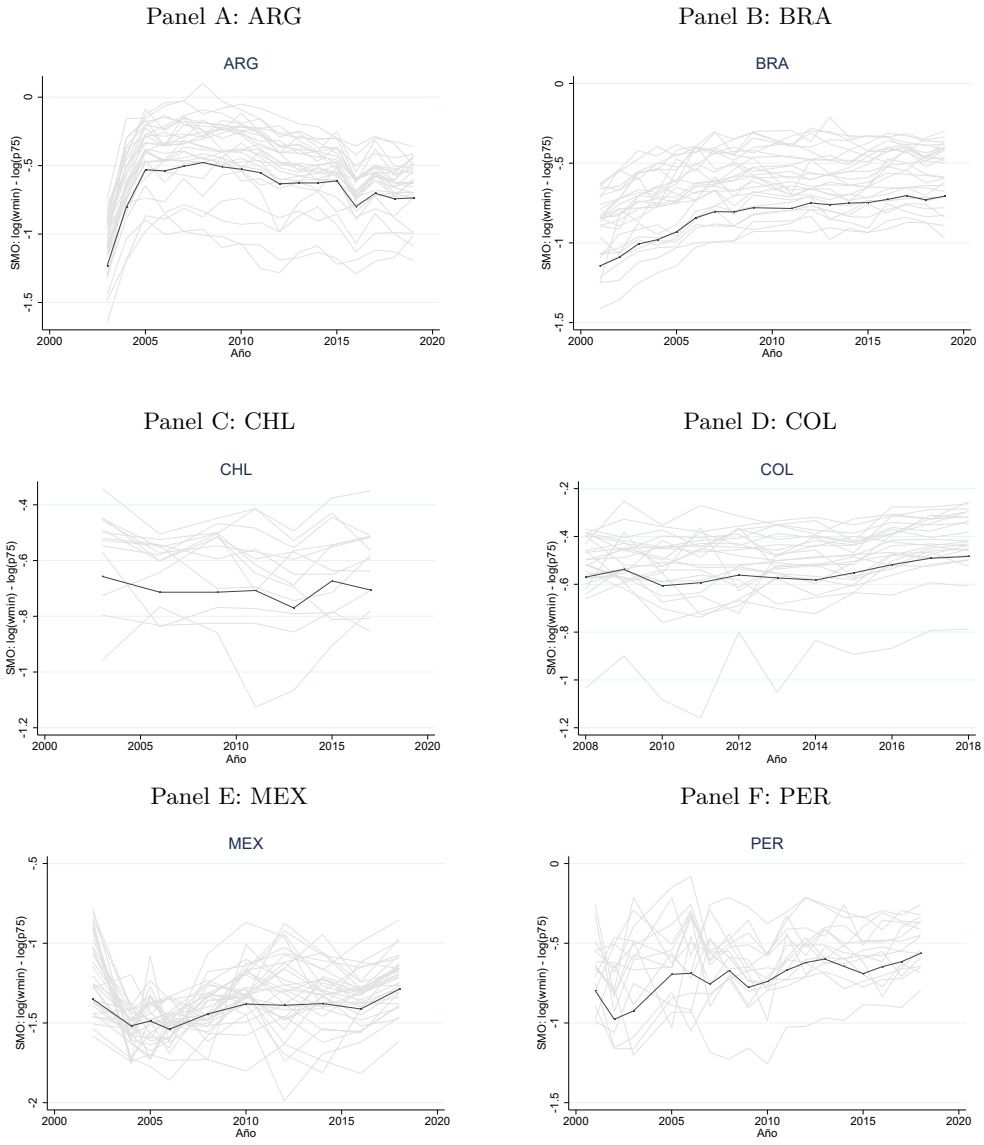
Source. Own elaboration based on microdata from SEDLAC (CEDLAS and World Bank).

Tables A2 and A3 of Appendix A show the composition of workers earning below and above the minimum in terms of gender, education and age. Columns 1 and 2 of both tables show a decreasing share of men earning below and above the minimum over the period, where the share of men earning above the minimum are around 5pp higher than the share of men earning below. Regarding education, those workers earning above the minimum are more educated, where high-skilled share range between 30% and 40%; in contrast with a 10% average share for those workers earning below. It is important also to note that composition in terms of education of workers earning below is very similar to those earning at the minimum wage. Hence, as mentioned above, half of workers belonging these groups are med-skilled while the 40% remaining are low-skilled. Finally, as expected, the age structure also varies across groups. In this regard, workers earning above the minimum wage have lower proportion of young people compared to workers earning below, which agrees with statistics shown before regarding workers with wages around the minimum.

Finally, as discussed in Section 3 and as recently discussed, this analysis uses the 75th

percentile as the reference percentile. In this sense, it is important to show how the EMW ($wmin - w(p75)$) has performed across regions and over time. Figure 4 shows the EMW for all regions of each country over time, where the dark lines show the EMW national trend, while the gray lines show the evolution of the EMW for each region. For most of the countries, there is an increase in the national EMW over the period analyzed, with differences that differ across the regions examined. Hence, Figure 4 shows the existence of time and regional variability in the minimum wage effectiveness, which supports the proposed identification strategy.

Figure 4: Evolution of EMW across countries and regions



Notes. Each line corresponds to regional EMW, defined as $log(minwage) - log(p75)$. The $log(minwage)$ corresponds to the country national minimum wage in each year; while the $log(p75)$ is set at a region/year level.

Source. Own elaboration based on microdata from SEDLAC (CEDLAS and World Bank).

6 Results

6.1 Distributive effects of the minimum wage in Latin America

Table 3 presents the marginal effects of changes in the ratio $log(minwage) - log(p75)$ (the effective minimum wage, EMW) on the ratio $log(p) - log(p75)$ for selected percentiles, evaluated at its hours-weighted average across regions and years for our sample of formal employees. Additionally, in the last row we report the marginal effects of the EMW for the Gini of the regional wage distributions. We start by presenting OLS estimates in columns (1) and (2). Column 1 shows the estimates of a specification that includes region and year fixed effects; while the specification in Column 2 adds linear regional trends. As mentioned in Section 3, if the minimum wage compresses the wage distribution, it is expected to find positive coefficients for wage gaps below the reference percentile (a less negative $w(p) - w(p75)$); and negative coefficients above the reference percentile (a less positive $w(p) - w(p75)$). Results of Column 2 (our preferred specification for OLS) show that an increase of 10 log points in the effective minimum implies an increase of 4.2 log points in the ratio $log(p10) - log(p75)$ (first row). Similarly, the second row depicts that an analogous increase in the EMW narrows the gap between the first and third quartiles of the wage distribution by 3.9 log points.

Columns (3) and (4) present 2SLS estimates, both including region fixed effects. While the 3rd column also adds quadratic regional time trends, the last specification considers linear country time trends. Results of column 3 (our preferred IV specification) show that an increase of 10 log points in the EMW lowers 2 log points the ratio $log(p10) - log(p75)$ (first row).[6] Additionally, the effective minimum seems to reduce wage inequality as measured by the Gini index, as seen in all specifications.

[6] We also experimented including country fixed effects and linear trends interacted with country dummies. This has virtually no impact on the results of our estimations.

Table 3: OLS & 2SLS relationship between $log(p) - log(p75)$ and $log(minwage) - log(p75)$ for selected percentiles of formal workers' wage distribution

	OLS		2SLS	
	(1)	(2)	(3)	(4)
$p(10)$	0.421***	0.424***	0.200***	0.191***
	(0.040)	(0.040)	(0.037)	(0.037)
$p(25)$	0.367***	0.391***	0.153***	0.147***
	(0.026)	(0.026)	(0.023)	(0.024)
$p(50)$	0.236***	0.263***	0.075***	0.074***
	(0.021)	(0.022)	(0.016)	(0.016)
$p(80)$	-0.016*	-0.023**	-0.025***	-0.025***
	(0.008)	(0.009)	(0.007)	(0.007)
$p(90)$	-0.058**	-0.077***	-0.083***	-0.084***
	(0.025)	(0.027)	(0.020)	(0.019)
Gini	-0.101***	-0.108***	-0.062***	-0.061***
	(0.012)	(0.012)	(0.009)	(0.009)
Observations	1,909	1,909	1,909	1,909
F-stat			28.25	29.89
Region FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	No	No
Region trends	No	Linear	Quadratic	No
Country trend	No	No	No	Linear

Notes. We consider formal workers in the period 2001-2018 (with gaps depending on availability of national household surveys). All regressions are unweighted and for all of them, except the one in the last row, the dependent variable is $log(p) - log(p75)$ where p is the wage of the indicated percentile. For the last row, the dependent variable is the Gini of the wage distribution at regional level. Estimates are the marginal effects of $log(minwage) - log(p75)$, evaluated at its hours-weighted average across regions and years. For 2SLS specifications, the effective minimum and its square are instrumented by the log of the minimum, the square of the log minimum, and the log minimum interacted with the average real log median for the state over the sample. Standard errors clustered at the region level in parentheses. Kleibergen-Paap rk Wald F-statistics are shown. $***p < 0.01$; $**p < 0.05$; $*p < 0.1$.

Source. Own elaboration based on data from SEDLAC.

As mentioned in the empirical strategy, estimations were carried out for each wage distribu-

tion percentile by changing the $log(p) - log(p75)$ ratio iteratively. Figure 5 complements Table 3, showing estimated marginal effects for all percentiles. On the one hand, the positive coefficients found in the lower tail of the wage distribution indicate that the gap between the wages of those percentiles and the wages of the 75th percentile becomes less negative. On the other hand, the negative coefficients observed for the upper tail of the distribution imply a reduction of the initial positive gap between the top wages and the reference percentile. This narrowing in the gap both in the lower and upper end of the wage distribution seems to have determined a wage compression on the wage distribution. Thus, the minimum wage appears to have had an equalizing impact in Latin America in the 2000s and 2010s. Although this effect is not typical of developed economies (Autor et al., 2016; Lee, 1999) where, for example, the minimum wage is binding only at the lower end of the wage distribution, evidence in favor of such an effect has been found in some developing countries (Engbom and Moser, 2021; Bosch and Manacorda, 2010).

Figure 5: 2SLS relationship between $log(p) - log(p75)$ and $log(minwage) - log(p75)$ for selected percentiles of formal workers' wage distribution

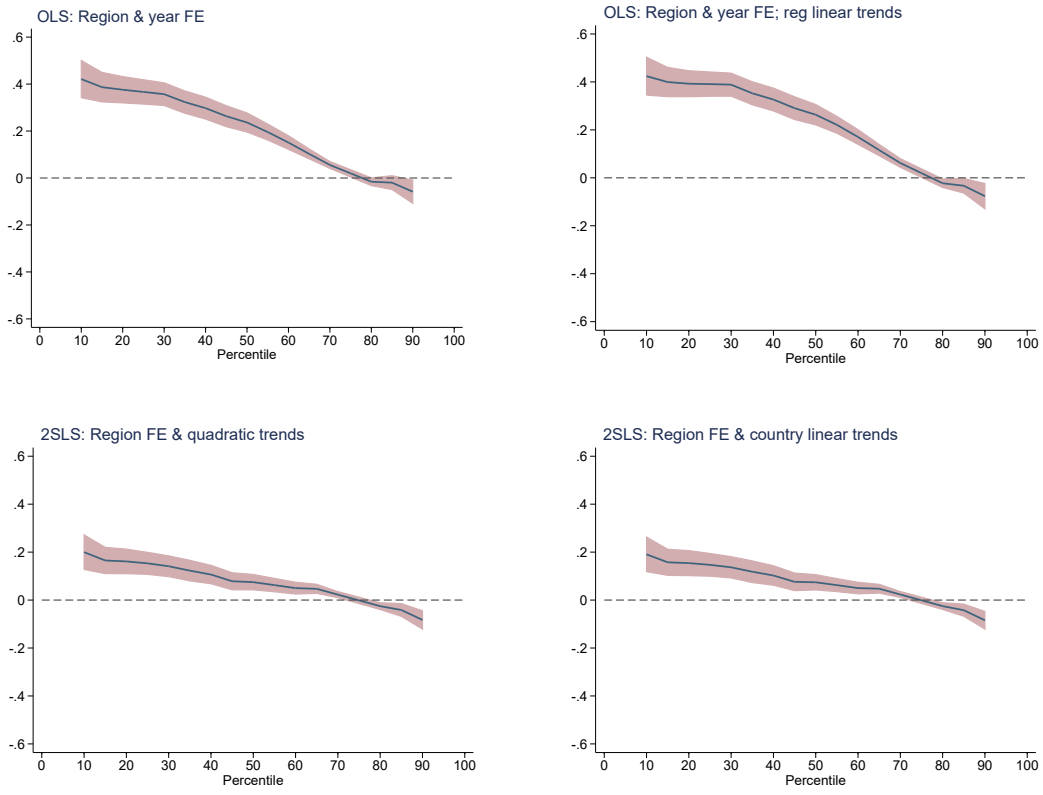


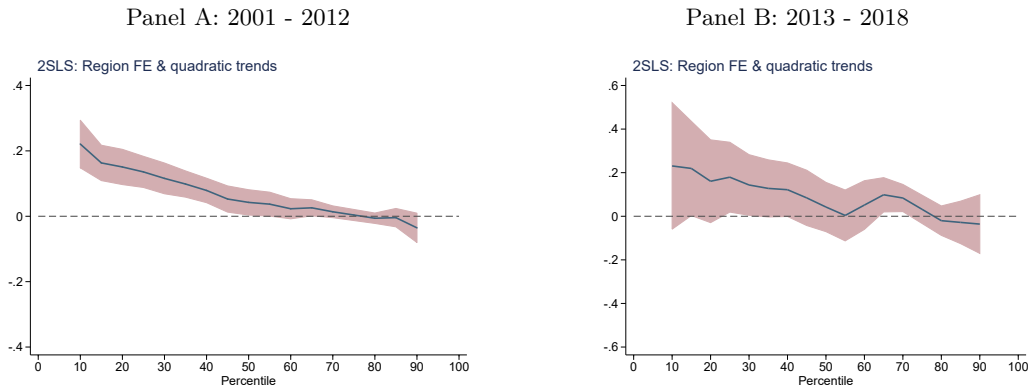
Figure A1 of Appendix A shows the variability in the effect of EMW for each of the countries analyzed. Despite the differences in the precision of the estimates, we observe a common pattern across countries similar to the average effect found for Latin America, with an equalizing minimum wage effect that decreases through the wage distribution, except for Chile.

6.2 Heterogeneous distributive effects of the minimum wage in Latin America in 2001-2012 and 2013-2018

The period analyzed in Latin America can be subdivided into two parts. The first period between 2001 and 2012 with remarkable growth rates in the region, accompanied by a reduction in inequality in almost all countries, possibly driven by the commodities price boom. This was followed by a second period between 2013 and the present day, where the favorable macroeconomic context changed, bringing a slowdown (or even stagnation) in reducing inequality (Acosta et al., 2019; Gasparini, 2019). The antagonistic macroeconomic contexts mentioned could have generated different consequences of the change in minimum wage during those periods. In fact, when macroeconomic conditions are more unfavorable, rises in the minimum wage could cause adverse impacts in terms of inequality (Ferreira et al., 2017).

In Figure 6 we present the effects of the EMW on wage gaps for the two periods aforementioned. As can be seen, the average effect found in Table 3 would seem to occur during 2001-2012. During this period, our IV estimates show an equalizing impact of the minimum wage stemming from the left tail of the wage distribution; while in the 2013-2018 period, the effect of the EMW would seem to be negligible and rather noisier.

Figure 6: 2SLS relationship between $log(p) - log(p75)$ and $log(minwage) - log(p75)$ for selected periods



Notes. All regressions are unweighted and for all of them the dependent variable is $log(p) - log(p75)$ where p is the wage of the indicated percentile. We consider formal workers in the period 2001-2012 (Panel A), and the period 2013-2018 (Panel B). Years might have gaps depending on availability of national household surveys. The red shaded areas represent 95 percent confidence intervals.
Source. Own elaboration based on data from SEDLAC.

6.3 Heterogeneous distributive effects of the minimum wage in Latin America by wage distributions of skills, age and gender

The results mentioned above about minimum wage effects on wage inequality may vary according to workers characteristics, as gender, age or education, among other factors. To explore this possibility, we constructed multiple sub-samples (according to different characteristics) and computed new minimum wage effects on percentiles of sample-specific wage distributions. Hence, Table 4 presents marginal effects that were estimated considering each one of the following sub-groups: i) accoording to gender: men and women; ii) according to educational level: low, medium and high skilled and; iii) according to age: workers between 18 and 24 years old and workers between 25 and 64 years old.

According to gender, the effects are concentrated in male workers; while when considering different sub-samples according to education, those workers with medium qualification seem to be the ones more affected. Besides, when carrying out the analysis according to age, there seem not to be clear differences between both subgroups, which differs from USA literature that found greater effects for young workers.

Table 4: 2SLS relationship between $log(p) - log(p75)$ and $log(minwage) - log(p75)$ for selected percentiles of formal workers' Wage Distribution by socio-demographic characteristics

	Gender		Education			Age	
	Men	Women	Low-skilled	Med-skilled	High-skilled	Young	25-60 years old
$p(10)$	0.228***	0.093	0.277*	0.122*	0.004	0.605**	0.205***
	(0.040)	(0.101)	(0.166)	(0.068)	(0.090)	(0.248)	(0.042)
$p(25)$	0.164***	0.042	0.070	0.123***	-0.079	0.123*	0.139***
	(0.028)	(0.046)	(0.048)	(0.033)	(0.069)	(0.071)	(0.025)
$p(50)$	0.070***	0.051*	0.050	0.076***	-0.107**	0.056	0.072***
	(0.018)	(0.030)	(0.032)	(0.021)	(0.046)	(0.050)	(0.016)
$p(80)$	-0.024***	-0.002	0.023*	-0.016*	0.033**	0.030*	-0.014
	(0.009)	(0.012)	(0.014)	(0.009)	(0.015)	(0.018)	(0.010)
$p(90)$	-0.059***	-0.024	0.022	-0.059***	0.074*	0.088***	-0.055**
	(0.021)	(0.026)	(0.029)	(0.016)	(0.039)	(0.033)	(0.022)
Observations	1,653	1,652	1,649	1,654	1,648	1,648	1,654
F-stat	30.15	8.40	15.85	54.58	18.84	15.08	26.75

Notes. Sample period is 2001-2018 with gaps depending on availability of national household surveys and consists only of formal employees. Columns 1 and 2 present estimates for the wage distribution of registered workers considering only men and women, respectively. Columns 3 to 5 also consider sub-samples of formal workers, respectively: individuals with less than completed high school, with completed high school, and with tertiary education or more. Finally, columns 6 and 7 consider formal workers by age sub-samples, columns names are self-explanatory. For all regressions the dependent variable is $log(p) - log(p75)$ where p is the wage of the indicated percentile. Estimates are the marginal effects of $log(minwage) - log(p75)$, evaluated at its hours-weighted average across regions and years. Standard errors clustered at the region level in parentheses. Regressions are unweighted, otherwise they would give disproportionate importance to only Brazil and Mexico. For 2SLS specifications, the effective minimum and its square are instrumented by the log of the minimum, the square of the log minimum, and the log minimum interacted with the average real log median for the state over the sample. All regressions include region FE and quadratic regional time trends. $***p < 0.01$; $**p < 0.05$; $*p < 0.1$.

Source. Own elaboration based on data from SEDLAC.

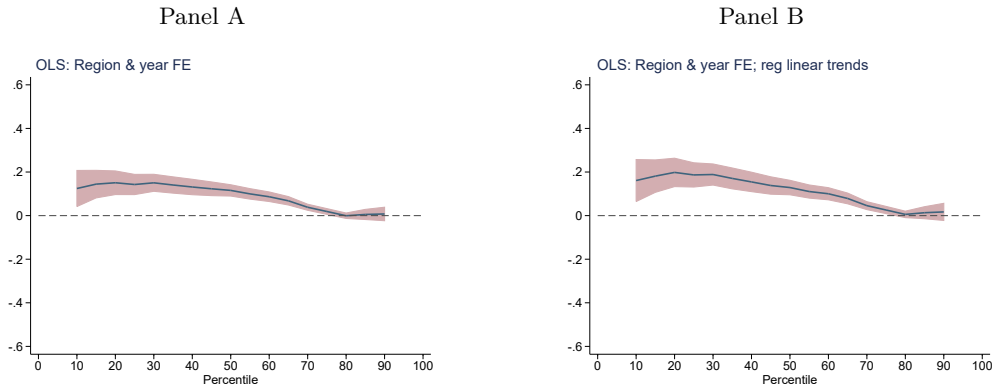
6.4 Lighthouse effect

A large number of Latin Americans work informally in their respective countries. According to our sample countries, the urban employed population working without social security contributions (our definition of informality) was, on average, 43.5% in 2018. In this context of informality, it is relevant to study whether a labor institution such as the minimum wage, which is binding for formal workers, affects informal ones.

Figure 7 shows OLS estimates of the effect of the EMW on wage gaps for informal workers' wage distribution. We show OLS estimates because the instrument we use is constructed to predict the effect of the minimum wage among formal workers. The relationship between the historical regional wage level and the biteness of the minimum wage among informal workers is not clear. In fact, the correlation between our IV and the effectiveness of the minimum wage for this sample is low. Panel (a) of the figure shows estimates that consider annual and regional fixed effects, while Panel (b) adds linear regional time trends. As can be seen in both figures,

the effective minimum wage would appear to have an equalizing impact on the left tail of the informal workers' wage distribution. In other words, the minimum wage would be reducing the existing gap between the informal workers who earn the least and those in the 75th percentile of the wage distribution.

Figure 7: OLS relationship between $log(p) - log(p75)$ and $log(minwage) - log(p75)$ for informal workers



Notes. All regressions are unweighted and for all of them the dependent variable is $log(p) - log(p75)$ where p is the wage of the indicated percentile. We consider informal workers in the period 2001-2018 (with gaps depending on availability of national household surveys). The red shaded areas represent 95 percent confidence intervals.
Source. Own elaboration based on data from SEDLAC.

These wage increases in the informal sector are consistent with the existence of a lighthouse effect. This means that, although the minimum wage is binding among formal workers, it would appear to act as a reference price in the informal sector for wage bargaining.

7 Robustness checks

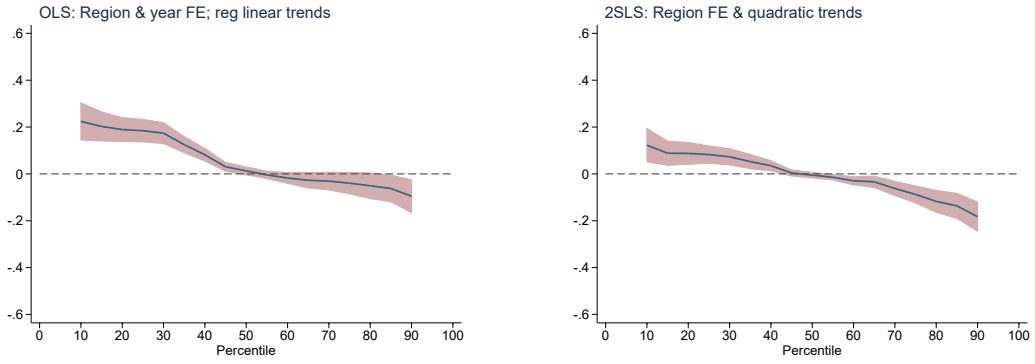
In this section, we perform several robustness exercises to provide further evidence of the effects found in this paper and more confidence about the empirical strategy implemented.

First, we re-estimate our main results by changing the reference wage percentile chosen to calculate the minimum wage bite. As shown in Figure 8, the EMW has an equalizing effect throughout the whole wage distribution when using the median and $p(90)$ as reference percentiles.[7] As can be seen, our results are robust to the use of these other reference percentiles typically used in the literature.

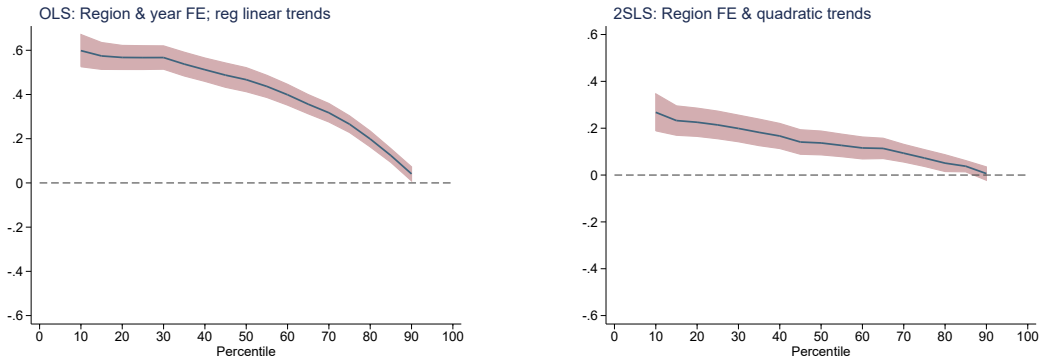
[7] Tables A5 and A6 in Appendix A complement Figure 8.

Figure 8: OLS & 2SLS relationship between $log(p) - log(ref)$ and $log(minwage) - log(ref)$ for $ref = 50$ and $ref = 90$ of formal workers' wage distribution

Panel A - Relative to $p50$



Panel B - Relative to $p90$



Additionally, we carried out several specifications in our OLS and 2SLS estimates, and conclusions about the marginal effect of minimum wage throughout wage distribution are essentially unchanged.

8 Concluding remarks

The minimum wage is at the core of the debate on labor policies. How effective is this instrument to increase real wages at the bottom, and hence reducing wage inequality? Does the impact depend on the phase of the business cycle? Are there spillovers to informal workers? This paper contributes to the rich literature on these issues by exploring the effect of the MW on the wage distributions of the six largest economies in Latin America (Argentina, Brazil, Chile, Colombia, Mexico and Peru) over the last two decades. To that aim we exploit the heterogeneity in the degree of bindingness of the nationally-set minimum wage across local labor markets and over time.

Our results suggest that the MW has been effective in the 2000s, a decade of sustained growth and strong labor markets. The positive impact of the MW on wages of formal workers decreases over the percentiles of the wage distribution. We also find some evidence that the equalizing effect spills over the informal sector of the economy: wages in the bottom of the distribution of informal workers are also lifted by this policy. Interestingly, the effects of the minimum wage on formal and informal workers seem to vanish in the 2010s, a decade of much weaker labor markets.

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Appendix A

Table A1: Workers earning below, at and above the minimum wage across countries

	ARG			BRA			CHL			COL			MEX			PER		
	Below	At	Above	Below	At	Above	Below	At	Above	Below	At	Above	Below	At	Above	Below	At	Above
2003	4%	4%	92%	7%	12%	81%	28%	13%	59%	n/d	n/d	n/d	1%	2%	96%	18%	11%	70%
2004	13%	10%	77%	7%	12%	82%	25%	15%	60%	n/d	n/d	n/d	1%	2%	96%	n/d	n/d	n/d
2005	25%	16%	59%	7%	13%	80%	23%	16%	61%	n/d	n/d	n/d	1%	2%	97%	25%	15%	59%
2006	24%	16%	60%	8%	16%	75%	21%	17%	62%	n/d	n/d	n/d	0%	2%	97%	24%	15%	60%
2007	25%	17%	58%	9%	17%	75%	20%	17%	62%	n/d	n/d	n/d	1%	2%	97%	21%	13%	65%
2008	26%	16%	57%	8%	16%	76%	20%	18%	63%	16%	24%	60%	1%	2%	97%	24%	14%	62%
2009	23%	17%	60%	8%	20%	72%	19%	18%	63%	15%	26%	60%	1%	2%	97%	19%	14%	67%
2010	24%	16%	60%	8%	19%	74%	16%	21%	63%	13%	24%	63%	1%	2%	96%	18%	15%	66%
2011	22%	14%	64%	7%	17%	75%	13%	25%	62%	13%	24%	63%	1%	2%	96%	24%	15%	61%
2012	17%	13%	70%	8%	18%	74%	14%	22%	65%	14%	25%	61%	2%	2%	95%	25%	16%	59%
2013	16%	13%	71%	7%	19%	74%	14%	18%	68%	14%	24%	62%	1%	2%	96%	24%	16%	60%
2014	16%	12%	72%	6%	17%	77%	13%	20%	67%	12%	25%	63%	1%	3%	96%	19%	15%	66%
2015	16%	11%	73%	6%	19%	75%	12%	22%	66%	11%	24%	64%	1%	2%	97%	18%	15%	66%
2016	9%	9%	82%	7%	21%	72%	12%	22%	66%	12%	28%	60%	1%	2%	97%	20%	15%	65%
2017	13%	11%	76%	6%	24%	70%	11%	23%	66%	12%	30%	59%	1%	3%	96%	23%	15%	62%
2018	10%	9%	82%	6%	21%	74%	n/d	n/d	n/d	12%	31%	57%	2%	3%	95%	23%	15%	62%

Notes. *Notes*. Due to households surveys availability, Latin American averages were computed for 2003-2018.
Source. Own elaboration based on microdata from SEDLAC (CEDLAS and World Bank).

Table A2: Summary statistics for workers earning below the minimum wage

	Gender		Education			Age	
	Men	Women	Low-skilled	Med-skilled	High-skilled	Young	25-60 years old
2003	63.2%	36.8%	39.5%	52.4%	8.1%	23.6%	76.4%
2004	62.5%	37.5%	38.8%	52.8%	8.4%	24.1%	75.9%
2005	63.9%	36.1%	40.0%	50.8%	9.1%	26.5%	73.5%
2006	65.6%	34.4%	33.2%	57.7%	9.1%	23.6%	76.4%
2007	63.3%	36.7%	33.0%	57.3%	9.7%	21.5%	78.5%
2008	62.1%	37.9%	32.2%	56.9%	10.9%	21.5%	78.5%
2009	62.7%	37.3%	33.4%	56.8%	9.9%	21.2%	78.8%
2010	62.9%	37.1%	33.4%	57.2%	9.4%	21.4%	78.6%
2011	59.5%	40.5%	34.2%	55.5%	10.2%	21.5%	78.5%
2012	57.9%	42.1%	33.6%	55.8%	10.6%	19.6%	80.4%
2013	58.8%	41.2%	31.3%	58.1%	10.6%	20.9%	79.1%
2014	57.8%	42.2%	29.5%	60.5%	10.0%	22.4%	77.6%
2015	59.4%	40.6%	27.9%	60.4%	11.7%	20.5%	79.5%
2016	60.6%	39.4%	25.5%	60.9%	13.6%	19.0%	81.0%
2017	59.3%	40.7%	24.1%	63.1%	12.9%	18.8%	81.2%
2018	58.6%	41.4%	23.8%	64.0%	12.2%	19.6%	80.4%

Notes. Notes. All columns refers to the unweighted average of national shares. Due to households surveys availability, Latin American averages were computed for 2003-2018.

Source. Own elaboration based on microdata from SEDLAC (CEDLAS and World Bank).

Table A3: Summary statistics for workers earning above the minimum wage

	Gender		Education			Age	
	Men	Women	Low-skilled	Med-skilled	High-skilled	Young	25-60 years old
2003	69.6%	30.4%	21.6%	47.2%	31.2%	13.9%	86.1%
2004	69.5%	30.5%	20.7%	47.3%	32.0%	12.9%	87.1%
2005	70.2%	29.8%	19.3%	48.2%	32.5%	12.5%	87.5%
2006	69.3%	30.7%	17.9%	48.6%	33.5%	12.6%	87.4%
2007	69.8%	30.2%	17.7%	49.1%	33.1%	13.2%	86.8%
2008	68.0%	32.0%	16.5%	47.9%	35.6%	13.2%	86.8%
2009	67.4%	32.6%	15.5%	48.7%	35.9%	12.8%	87.2%
2010	67.7%	32.3%	15.2%	49.5%	35.3%	12.1%	87.9%
2011	67.1%	32.9%	14.4%	49.9%	35.7%	12.8%	87.2%
2012	67.1%	32.9%	14.7%	49.4%	35.9%	12.8%	87.2%
2013	66.4%	33.6%	13.7%	49.6%	36.8%	12.6%	87.4%
2014	66.5%	33.5%	13.6%	50.0%	36.3%	12.3%	87.7%
2015	65.9%	34.1%	13.1%	50.8%	36.2%	11.4%	88.6%
2016	65.1%	34.9%	12.1%	49.4%	38.5%	10.9%	89.1%
2017	64.9%	35.1%	11.4%	48.9%	39.8%	10.5%	89.5%
2018	62.5%	37.5%	13.3%	54.5%	32.3%	13.2%	86.8%

Notes. Notes. All columns refers to the unweighted average of national shares. Due to households surveys availability, Latin American averages were computed for 2003-2018.

Source. Own elaboration based on microdata from SEDLAC (CEDLAS and World Bank).

Table A4: First stage correlations for selected percentiles of regional wage distributions

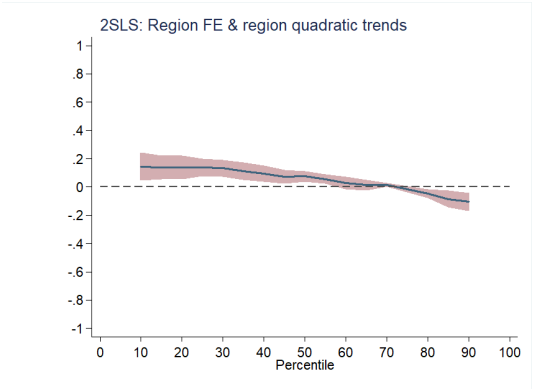
	EMW	EMW^2	EMW	EMW^2
***p*(25)**				
National MW	0.949***	-0.652**	0.900***	-0.739***
	(0.194)	(0.327)	(0.159)	(0.274)
Square national MW	-0.197***	0.692***	-0.213***	0.667***
	(0.041)	(0.077)	(0.038)	(0.073)
Interaction term	0.077	-1.071***	0.133	-0.978***
	(0.157)	(0.293)	(0.124)	(0.239)
***p*(50)**				
National MW	0.949***	-0.652**	0.900***	-0.739***
	(0.194)	(0.327)	(0.159)	(0.274)
Square national MW	-0.197***	0.692***	-0.213***	0.667***
	(0.041)	(0.077)	(0.038)	(0.073)
Interaction term	0.077	-1.071***	0.133	-0.978***
	(0.157)	(0.293)	(0.124)	(0.239)
***p*(70)**				
National MW	0.949***	-0.652**	0.900***	-0.739***
	(0.194)	(0.327)	(0.159)	(0.274)
Square national MW	-0.197***	0.692***	-0.213***	0.667***
	(0.041)	(0.077)	(0.038)	(0.073)
Interaction term	0.077	-1.071***	0.133	-0.978***
	(0.157)	(0.293)	(0.124)	(0.239)
***p*(90)**				
National MW	0.949***	-0.652**	0.900***	-0.739***
	(0.194)	(0.327)	(0.159)	(0.274)
Square national MW	-0.197***	0.692***	-0.213***	0.667***
	(0.041)	(0.077)	(0.038)	(0.073)
Interaction term	0.077	-1.071***	0.133	-0.978***
	(0.157)	(0.293)	(0.124)	(0.239)
Observations	1,909	1,909	1,909	1,909
F-stat	30.68	30.68	32.26	32.26
Region FE	Yes	Yes	Yes	Yes
Year FE	No	No	No	No
Region trends	Quadratic	Quadratic	No	No
Country trend	No	No	Linear	Linear

Notes. Coeficients are first stage estimates of 2SLS regressions in which the second stage dependent variable is $log(p) - log(p75)$ where p is the wage of the indicated percentile. We consider formal workers in the period 2001-2018 (with gaps depending on availability of national household surveys). All regressions are unweighted. In the first stage, the effective minimum and its square are instrumented by the log of the natinal minimum wage, its square, and the log minimum interacted with the average real log median for the state over the sample ("interaction term"). Standard errors clustered at the region level in parentheses. Kleibergen-Paap rk Wald F-statistics are shown. $***p < 0.01$; $**p < 0.05$; $*p < 0.1$.

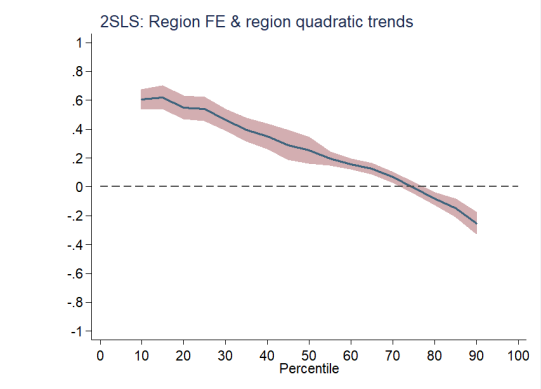
Source. Own elaboration based on data from SEDLAC.

Figure A1: 2SLS relationship between $log(p) - log(p75)$ and $log(minwage) - log(p75)$ for selected percentiles of registered workers' wage distribution

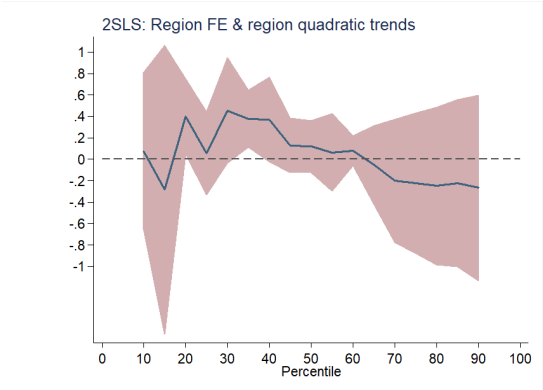
ARG



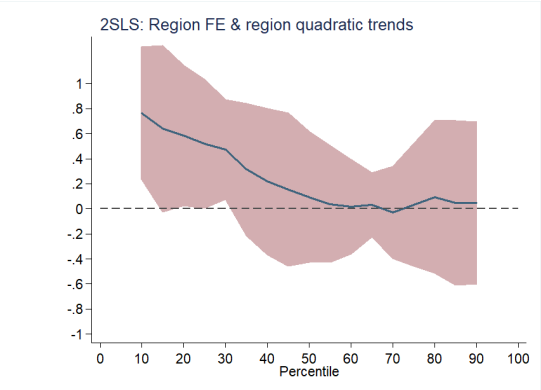
BRA



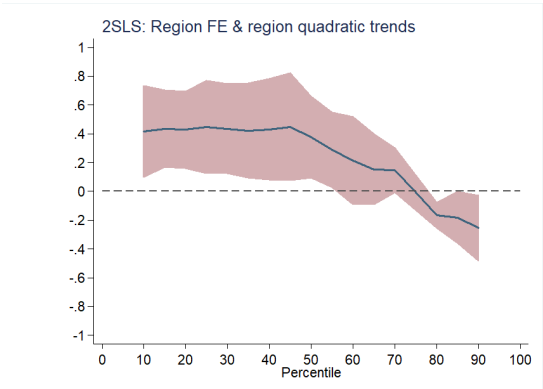
CHL



COL



MEX



PER

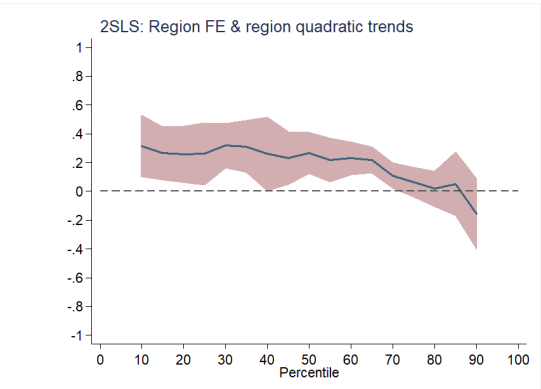


Table A5: OLS relationship between $log(p) - log(p_{ref})$ and $log(min.wage) - log(p_{ref})$ for selected percentiles of Formals' Wage Distribution

	Panel A - reference $p(50)$		Panel B - reference $p(90)$	
	(1)	(2)	(3)	(4)
$p(10)$	0.221***	0.224***	0.602***	0.598***
	(0.037)	(0.040)	(0.043)	(0.037)
$p(25)$	0.167***	0.184***	0.554***	0.567***
	(0.021)	(0.024)	(0.033)	(0.027)
$p(40)$	0.069***	0.082***	0.496***	0.512***
	(0.010)	(0.013)	(0.033)	(0.027)
$p(75)$	-0.024	-0.040*	0.254***	0.266***
	(0.018)	(0.023)	(0.022)	(0.019)
$p(80)$	-0.022	-0.051*	0.191***	0.199***
	(0.020)	(0.028)	(0.019)	(0.018)
$p(95)$	-0.056	-0.137***	-0.046***	-0.042**
	(0.042)	(0.049)	(0.015)	(0.016)
Observations	1,909	1,909	1,909	1,909
Region FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Region trends	No	Linear	No	Linear
Country trend	No	No	No	No

Notes. We consider formal workers in the period 2001-2018 (with gaps depending on availability of national household surveys). All regressions are unweighted. In regressions of Columns (1) and (2) the dependent variable is $log(p) - log(p50)$ where p is the wage of the indicated percentile. Estimates are the marginal effects of $log(minwage) - log(p50)$, evaluated at its hours-weighted average across regions and years.In regressions of Columns (3) and (4) the dependent variable is $log(p) - log(p90)$ where p is the wage of the indicated percentile. Estimates are the marginal effects of $log(minwage) - log(p90)$, evaluated at its hours-weighted average across regions and years. $***p < 0.01$; $**p < 0.05$; $*p < 0.1$.

Source. Own elaboration based on data from SEDLAC.

Table A6: 2SLS relationship between $log(p) - log(p_{ref})$ and $log(min.wage) - log(p_{ref})$ for select percentiles of Formals' Wage Distribution

	Panel A - reference $p(50)$		Panel B - reference $p(90)$	
	(1)	(2)	(3)	(4)
$p(10)$	0.123***	0.122***	0.268***	0.252***
	(0.036)	(0.036)	(0.040)	(0.040)
$p(25)$	0.082***	0.082***	0.214***	0.205***
	(0.019)	(0.019)	(0.030)	(0.029)
$p(40)$	0.035***	0.035***	0.167***	0.163***
	(0.011)	(0.012)	(0.027)	(0.027)
$p(75)$	-0.088***	-0.087***	0.073***	0.076***
	(0.019)	(0.019)	(0.018)	(0.017)
$p(80)$	-0.117***	-0.117***	0.051***	0.054***
	(0.024)	(0.025)	(0.018)	(0.017)
$p(95)$	-0.219***	-0.218***	-0.025	-0.030*
	(0.041)	(0.040)	(0.017)	(0.016)
Observations	1,909	1,909	1,909	1,909
F-stat	49.01	34.27	24.72	25.05
Region FE	Yes	Yes	Yes	Yes
Year FE	No	No	No	No
Region trends	Quadratic	No	Quadratic	No
Country trend	No	Linear	No	Linear

Notes. We consider formal workers in the period 2001-2018 (with gaps depending on availability of national household surveys). All regressions are unweighted. In regressions of Columns (1) and (2) the dependent variable is $log(p) - log(p50)$ where p is the wage of the indicated percentile. Estimates are the marginal effects of $log(minwage) - log(p50)$, evaluated at its hours-weighted average across regions and years.In regressions of Columns (3) and (4) the dependent variable is $log(p) - log(p90)$ where p is the wage of the indicated percentile. Estimates are the marginal effects of $log(minwage) - log(p90)$, evaluated at its hours-weighted average across regions and years. For 2SLS specifications, the effective minimum and its square are instrumented by the log of the minimum, the square of the log minimum, and the log minimum interacted with the average real log median for the state over the sample. Standard errors clustered at the region level in parentheses. Kleibergen-Paap rk Wald F-statistics are shown. $***p < 0.01$; $**p < 0.05$; $*p < 0.1$.

Source. Own elaboration based on data from SEDLAC.