The minimum wage in Ecuador
Its impact on poverty, inequality and labour market structure

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ABSTRACT
This article aims to present an overview of the impact of the minimum wage (MW) on the labour market in Ecuador. This Andean country is taken as a sample of all the countries in the region, with similar structural limitations in their labour markets. In Ecuador, the MW is positioned in the intermediate deciles. In the lower deciles, most of the workforce is informal or self-employed. The ‘lighthouse effect’ of the MW on the rest of the employed and self-employed workers is presumed to be the main force in reducing poverty and inequality. The lack of compliance with the labour regulation is, in part, explained by low levels of demand and productivity. These factors would limit firms’ ability to hold a wage increase and unemployment would rise. As savings are low and the welfare state does not offer a safety net to guarantee subsistence without a job, unemployed workers quickly transition into informality and self-employment. We use a two-way fixed effects regression to test this hypothesis. Results show that they cannot be rejected, suggesting the need for new labour policies to reduce poverty and inequality, according to the economic reality of the region.

KEY WORDS
inequality, poverty, minimum wage, labour market, Ecuador

Introduction
The import of economic policy tools from OECD countries, aimed at improving the quality of life of citizens, is a common practice in South America. We question here the validity of the minimum wage (MW) policy in South America (SA) as a tool to
reduce poverty and inequality considering the limited consensus of empirical 
literature in the region.

As a tool to improve the quality of life of the most vulnerable groups, the increase 
in the MW is perverted because it is not located in the lower deciles of income 
distribution, but in the intermediate ones. By 2015, 47% of the workers in SA were not 
covered by the law, with 20% being informal workers and 27% self-employed (ILO, 
2017). These labour groups will not be affected directly by increases in the MW. 
However, the MW remains a benchmark for the living minimum income. Even in an 
informal employment relationship, employees pressure their firms, and the self-
employed will improve their productivity to achieve it; this is the so-called ‘lighthouse 
effect’. The ‘lighthouse effect’, of limited scope, is the main effect on the income of the 
lower deciles.

The lack of compliance with labour legislation is traditionally explained by low 
demand and productivity, which limits companies from paying better wages. The 
economic structures in SA, unlike in most OECD countries, do not have the capability 
to canalise the MW increase through efficiency improvements and price increases. 
Therefore, raising the MW increases unemployment.

This increase in unemployment is not sustained over time. Unemployment is no 
longer an option as it cannot maintain a decent standard of living without work because 
there is no alternative source of permanent income for survival (e.g. unemployment 
insurance, savings, capital revenue, monetary transfers). The state does not have a 
system of protection against unemployment capable of supporting the citizenry 
between jobs. Nor can the savings available, in the lowest deciles, generate sufficient 
resources to allow them to remain unemployed. As a result, unemployment is 
immediately transformed into informality and self-employment. The demand for 
formal work is reduced and unemployed people have no choice but to accept it. The 
demand for formal labour is reduced either because productivity levels do not support 
the recruitment of formal workers, or because employers prefer to maintain or increase 
their profit margin.

The movement from unemployment to informality/self-employment is possible 
because of the weak enforcement of Ecuadorian labour law regarding the registration of 
companies in order to operate. The informality of firms is implicitly accepted in the 
modern economy (sometimes as a merciful act) to allow the subsistence of those who 
have no place in the labour market in traditional sectors.

The aim of this research is to study whether the phenomena described above occur 
in Ecuador and the intensity with which they occur. Despite the fact that the literature 
on the impact of the MW in Ecuador is very limited, it continues to occupy huge 
amounts of the public–private labour market dialogue space. Although it is notorious 
that the impact it might have is significantly less than it might have in traditionally 
industrialised countries, it remains, for both employers and trade unions, an important 
element of dispute.

This research aims to contribute to delineating the dimensions of the MW in the 
space of social dialogue in terms of its capacity to generate changes in the labour 
market. For this reason, a general analysis is carried out, encompassing several related
fundamental spaces. In each case, the aim is to consider not only the impact of MW changes, but the dimension of each of these impacts, if any.

To understand the global impact of MW increases, seven hypotheses are proposed to be tested in Ecuador, using annual data ranging from 2007 to 2017. The hypotheses correspond to responses of various labour market indicators when faced with an increase in the MW and are as follows.

(H1 and H2): an increase in the MW will result in an increase in wages for the informal and self-employed workers in the lower deciles (LD);

(H3 and H4): an increase in the MW will result in a low reduction in poverty and inequality reduction; and

(H5, H6 and H7): an increase in the MW will not lead to an increase in employment, but to an increase in informality and self-employment in the LD.

The research presented here tests these hypotheses in Ecuador using a two-way fixed effect regression. This estimator allows us to adjust for unobserved unit- and time-specific variables. Given that the MW is set nationwide, we use the 'bite' of the MW to capture variation within provinces and years. A series of outcome variables are evaluated at different deciles for the income distribution.

The panel was built at a province level from household surveys carried out between 2007 and 2019.

The application of the above methodology makes it possible not to reject the assumptions made.

The rest of this article is organised as follows. The next section presents a review of relevant related theoretical literature and presents the hypotheses. The following section describes the data and the methodology applied to test them. This is followed by a section in which the results are presented. The final section discusses these results and draws conclusions from them.

**Literature review**

The stated purpose of a statutory MW is to reduce poverty and inequality (Sobel, 1999). In the OECD countries, there is a general consensus that the introduction of the MW increases the likelihood of reaching these objectives (Belman & Wolfson, 2014; Guichard & Pinel, 2018; ILO, 2012). As a consequence, the OECD (2015) countries, the European Union (McKnight et al., 2016) and the G20 countries (IMF, 2014) all claim that the MW is a useful mechanism for stopping and reducing the systematic growth in poverty and inequality that have been registered in recent decades (OECD, 2018).

In developing countries, the impact of raising the MW is not so positive. In general terms, the effect on reducing poverty is modest, if it exists, because it is in practice related to the workers in the medium-low deciles, but not to the lowest ones (Saget, 2001). In relation to inequality, the MW variations contribute to reducing it, but the effect is smaller, sometimes only symbolic (Gindling, 2014).

In Latin America (LA), where the countries are in different categories of income, there is no consensus about the effects on poverty of increasing the MW. Even when
similar regression methodologies are used, results regarding the income of the poorest decile can have either a positive or negative result depending on the country and time period analysed.

There is evidence of a positive impact of variations of MW on poverty reduction in Nicaragua (Alaniz, Gindling & Terrell, 2011), Argentina (Grimshaw & Miozzo, 2003) and Perú (Jaramillo, 2004), and a negative influence in Brazil (Neumark, Cunningham & Siga, 2006) and Honduras (Gindling & Terrell, 2009). In Brazil, Paes De Barros, Henriquez & Mendonça (2001) and Colombia (Arango & Pachón, 2004) did not find any evidence of a relationship between MW variations and poverty reduction.

As for the effect on inequality, the relevant literature agrees that increasing the MW would also be ambiguous in its direction, and, in any case, limited in its impact. Maurizio and Vázquez (2016) in Argentina, Brazil, Chile and Uruguay, Soares (2018) and Firpo and Portella (2019) in Brazil, Alves et al. (2012) in Uruguay and Maloney and Mendez (2003) in Colombia, found evidence of a positive impact of MW increase on inequality. Ferreira, Firpo and Messina (2017) found in Brazil that the impact of MW increase on inequality was ambiguous. Rani et al. (2013) found a compression in the income distribution in Brazil and Costa Rica, an ambiguous effect in Perú, and no effect in Mexico.

The lack of consensus about the impact of MW increases on poverty and inequality is related to the small number of people affected by it, especially in the lowest deciles (Belman & Wolfson, 2014). People who are not covered by the MW are in informal or self-employment sectors.

The informal sector (also studied in the context of the lack of compliance with the labour law) covers employees whose activities are not registered and who, consequently, are not recognised or protected by the law. According to the ILO (2019), globally, 40% of all waged workers are in informal employment. In SA, this rises to 54% of all waged workers. As informality is a matter especially related to the poorest groups (Herrero Olarte, 2021), the lowest deciles are therefore characterised by the people in informal conditions. According to a study of data from Perú and Brazil, the lack of compliance affects the least qualified workers and women (Rani et al., 2013). In Chile, indigenous and agricultural regions and foreign-born groups present the highest level of informality (Kanbur, Ronconi & Wedenoja, 2013). Informality is also more persistent in the lowest deciles. In the 2000s informality decreased in the middle and upper deciles in Argentina, Brazil, Ecuador, Paraguay and Perú, but in the lowest deciles the decrease was minimal (Beccaria & Maurizio, 2020).

There are two approaches that try to explain the amount and length of informality in the region: structuralism and institutionalism. According to the structuralist approach, informality is the result of the LA productive model. It is defined by the coexistence of a modern sector, characterised by high productivity and large-scale economies, and a traditional sector, defined by inefficient production processes and low added value (Lewis, 1954). As the modern sector has insufficient jobs, generally restricted to skilled employees, the unskilled workers are relegated to the informality of the traditional sector. Informality is therefore understood as a choice to subsist in the traditional sector among the unskilled workers, faced with the impossibility of finding a job in the modern
sector (Tokman, 2001b). This dual productive structure is the result of an incomplete industrialisation in an open economy (Prebisch & Cabañas, 1957).

In the institutionalist approach, informality is the result of political decisions. Labour law enforcement is extremely complex and costly (Piore & Schrank, 2008), which is related to the worst compliance rates (Rani et al., 2013). Firms break the law to avoid regulations and obligations, and be able to offer a higher wage to their workers (Tokman, 2001a). Workers prefer to save the taxes they would have to pay in order to formalise and thus have a higher income (Tenjo, 2012). This is because wages are very low, and there is a lack of benefits related to becoming formal due to the low quality of public services (The World Bank, 2012). According to this approach, formalisation is a choice for the firms and the workers because the state allows it (Ghosheh, 2013). Informality is understood as a part of the culture and a means of subsistence. It is considered as a fundamental tool of economic performance, as a licence provided by the system to compensate for low productivity and high poverty rates.

Although the structure of the labour market in the lower deciles limits the impact of any MW increase, its value could nevertheless act as a reference for the economy in general, and for the income to be expected from employment and informal work. This is what is known as the theory of the ‘lighthouse effect’ which defines the MW in developing countries not as a decisive variable, but as a reference point (Souza & Baltar, 1979). Beyond its direct effect on formal employment, according to this theory, informal workers will seek to match their incomes with those in the formal sector. Conscious that prices will probably increase, informal workers will put pressure on their employers to raise wages to maintain their quality of life.

The majority of research on this topic has concluded that MW growth affects workers whose earnings are close to that value, regardless of whether they are formally or informally employed, reinforcing the idea that the ‘lighthouse effect’ exists. In Bolivia, Nogales, Córdova and Urquidi (2019) calibrated this by means of a job search comparison. In Brazil, Lemos (2009a) carried out a panel study. Kristensen and Cunningham (2006), using estimates for 19 Latin America countries, found that the MW has effects on both the formal and informal sectors, showing compressions in wage distributions around the MW. However, the significance and effect on the formal and informal sectors differ between countries, with no uniform effect across countries. Focusing on the group most affected by MW increases, Pérez Pérez (2020) found that increases were present in both the informal and formal sectors and were larger in the formal ones in Colombia. He combined unconditional quantile regressions with a differences-in-differences design. In Argentina, using quasi-experiments of MW bite changes, Khamis (2013) found that the impact on the informal sector in the case of the MW was stronger than in the formal sector.

However, some literature suggests that the ‘lighthouse effect’ does not exist. Arcidiácono (2015) arrived at this conclusion in Argentina, calculating the distributive effect of the MW on the gap between the MW and the income of a reference percentile on wage dispersion. Grau, Miranda and Puentes (2018) reached the same conclusion in Chile using a panel. In addition to informality, the weight of the self-employment sector in LA is another factor that limits the impact of MW increases on poverty and inequality. The self-employed are defined as individuals working on their own account,
without a relationship of dependence. This definition is perfectly applicable to both developed and developing countries; however, the reasons for becoming self-employed are very different.

Two theories try to explain the motivation of an individual to take up self-employment.

The 'Pull' theory explains that entrepreneurship and self-employment thrive in times of economic growth because such a condition establishes opportunities to create new businesses. In this scenario, self-employment represents an opportunity for individuals to improve their working conditions (Thurik et al., 2011). On the other hand, the 'Push' theory argues that, given a deterioration of the formal labour market, unemployment increases. To maintain a living income, previously employed individuals jump to the self-employed jobs, usually informal. These jobs tend to have worse working conditions than the ones in the formal sector.

The 'Push' theory explains the evolution of the self-employment sector in SA. Indeed, more than three-quarters of companies arise from self-employment among the most vulnerable groups as a mechanism to survive (Boeri & Ours, 2008). Consequently, self-employment is highly correlated with poverty, extreme poverty and premature death (Caceres & Caceres, 2017).

As a consequence of the two contrasting approaches to self-employment, the data diverge significantly between countries. While in high-income countries self-employed workers account for 12% of the total labour market, in low-income countries more than 80% are own-account workers (The World Bank, 2020).

In LA, 37.5% of the workforce is self-employed compared with 16.6% in OECD member countries.

The 'lighthouse effect' is as relevant to the self-employment scenario as it is to informal employment, and this too has been researched. Maloney and Mendez (2003) in Colombia, and Fajnzylber (2005) in Brazil found that an increase in the MW was linked to an increase in the incomes of the self-employed to a level around the MW.

The impact of raising the MW on poverty and inequality is also conditioned by its influence on the quantity and quality of formal work. In the OECD countries, the channels of adjustment for the MW increase would be, above all, improvements in efficiency and small price increases (Schmitt, 2013). The employment consequences of the MW increase are minimal (Doucouliagos & Stanley, 2009; Wolfson & Belman, 2019). In fact, MW increases could even have a positive impact on employment (Belman & Wolfson, 2014). The limited and even positive impact of MW increases on employment, according to Kaufman (2010), is due to the expansion in demand and the multiplier effect.

In LA, efficiency improvements and price increases are more difficult to achieve as a means to channel the impacts of MW increases because of low levels of productivity and demand. Indeed, low productivity growth is regarded as the root cause of the region’s poor economic performance in the last four decades (Daude, Fernández-Arias & Pezzini, 2010). Productivity is linked to innovation (Hall & Jones, 2005) and innovation is very limited in LA, where is largely confined to imitation and technology transfer (Katz, 1986), with little or no impact on international markets. The poor behaviour of innovation is because investment is relatively very expensive, in the
context of limited capital availability, the long time it takes to recover the investment (Pagés, 2010) and the low incentives to invest in innovation when there is a large distance between the LA firms and the technological frontier (Acemoglu, Aghion & Zilibotti, 2006). On the other hand, the small percentage of the population with incomes higher than the subsistence level, makes it impossible for companies to increase their prices. If they increase them, the loss of demand could endanger the company. Demand in LA cannot absorb the price increases that, in OECD countries, would result from increasing the MW.

Therefore, MW rises in LA would be related to an increase in unemployment and, consequently, to the rise in informality and self-employment. This effect is especially relevant for Latin American countries since it is one of the regions with the highest unemployment worldwide. In 2017, LA countries registered an unemployment rate of 8.1% compared to 5.6% worldwide and 5.9% in OECD countries.

Unemployment in Latin America is not only high; it also disproportionately affects the poorest. In the lowest income quintile, 12.5% of people are unemployed. For the highest income quintile, this drops to 2.7%. Even though in the last 20 years the region has seen a substantial reduction in average unemployment, the gap between the richest and the poorest has grown wider. This effect has been especially noticeable since 2013, when the price of commodities, on which the Latin American region is heavily dependent, began to fall (Ocampo, 2017).

The literature on these topics often reports ambiguous results concerning employment (Bell, 1997). MW increases have been found not to be related to an increase in unemployment in Argentina (Groisman, 2012), Brazil (Lemos, 2009b, 2009a) or Mexico (Bouchot, 2018). On the other hand, MW increases and unemployment were found to be related in Colombia (Mora & Muro, 2017; Messina & Silva, 2018) and Bolivia (Nogales, Córdova & Urquidi, 2019).

Regarding informality, MW increases are related to a growth in informality in Bolivia (Nogales, Córdova & Urquidi, 2019) and Colombia (Mora & Muro, 2017) and to an increase in self-employment in Costa Rica (Terrell & El Hamidi, 2005).

The research reported here aimed to understand the impact of the MW on various variables related to the labour market in Ecuador. The work was carried out in Ecuador because the topic of the MW is a fundamental element of the dialogue between trade unions and employers and a key element of the programmes of the different political parties. Despite this, general and accurate information on the subject is very limited.

In the literature that exists in Ecuador, Canelas (2014) used a fixed effects panel to analyse the effect of the MW on the formal and informal income of the total labour force. To define informal workers, he identified three categories: self-employed workers; workers in small firms with fewer than ten employees; and workers who were not affiliated with the social security system. In relation to these three categories, the research concluded that the raising of the MW has had a positive effect on all labour income, but was particularly high for the group of informal workers. In addition, no positive effect on the level of employment similar to that of a monopsony market (see Card & Krueger, 1993) was found, which, according to the author, is due to the high levels of non-compliance with labour legislation in Ecuador.
In line with these results, Guzman (2018) found that, for salaried employees (excluding employers and self-employed workers), campaigns to improve labour law enforcement and a significant increase in the MW in real terms have resulted in a compression of the wage income distribution at the national level. This compression occurs because wage increases in the bottom half of the distribution are especially large and significant. Finally, this author suggests that, as MW policy enforcement has improved with stricter laws, awareness campaigns and better labour inspection, some of the low-wage earners may have moved into informal employment, underemployment or unemployment.

Finally, Wong (2019) employed a quasi-experimental difference-in-difference design. To do so, he took advantage of the 2012 annual increase in the Universal Basic Subsistence level (UBS) to define the pre- and post-treatment periods. For this analysis, he focused on individuals who earned below the MW and who were covered by labour legislation (private employees). The control group was composed of workers who earned above the UBS or were outside the influence of labour legislation (self-employed, government employees and employers). The results suggested that a 1% increase in the UBS would generate a 0.45% increase in the income of this group compared to the control group. However, this increase is heterogeneous across gender, age groups and industries.

**Hypotheses used in this research**

Building on the literature review, various hypotheses were developed for this research, to be applied in Ecuador.

If MW increases, workers will be displaced from the formal to the informal or self-employed sectors (H1 and H2). Because of the ‘lighthouse effect’, informal and self-employment wages will increase (H3 and H4). The rapid movement to the formal and self-employment sectors will mean that unemployment remains unaffected (H5). Finally, the lighthouse effect will provide better income for the lower deciles, compressing the income distribution and reducing inequality (H6 and H7). The following seven hypotheses were developed to be tested in this research.

- **H1.** MW increases have a positive effect on the informality rate in LD.
- **H2.** MW increases have a positive effect on the self-employment rate in LD.
- **H3.** MW increases suppose an increase in informal workers’ wages in LD.
- **H4.** MW increases suppose an increase of self-employment income in LD.
- **H5.** MW increases have no effect on unemployment in LD.
- **H6.** MW increases suppose a reduction in poverty (measured by income)
- **H7.** MW increases suppose an inequality reduction.

**Data description and methodology**

The goal of the research was to estimate the effects of changes in the minimum wage (MW) on several outcome variables according to the hypotheses stated in the previous section. The analysed dependent variables were: informal and
self-employed workers as a share of the total workforce population, monthly average real earnings of both informal and self-employed workers by decile and unemployment. For this, annual microdata from household surveys was used (ENEMDU for its Spanish acronym). Surveys were conducted by the National Institute of Statistics and Census (INEC for its Spanish acronym). All data corresponds to surveys conducted in the month of December. The ENEMDU aims to provide information on the economic activity and sources of income of the population. This survey is designed to provide statistics on the levels, trends and changes over time of various labour market indicators such as, among the most important: the economically active population, economically inactive population, those in adequate employment, underemployment and unemployment.

Given the purpose of the research, only the population between 15 and 70 years of age was considered. Workers by province and year with income above the top or below the bottom percentile were excluded from the sample (these extreme values were considered likely to be associated with measurement error). Labour income, one of the response variables, was defined as the sum of the individual’s (formal) wage, informal income and self-employed income. Income derived from capital, retirement pensions, gifts and donations, remittances from abroad, cash transfers (Bono de Desarrollo Humano) as well as disability benefits was excluded. Labour income was deflated through the Consumer Price Index (CPI). All the variables were considered by province.

To construct the data panel, the province of Santa Elena was merged with Guayas, and the province of Santo Domingo de los Tsachila was merged with Pichincha. Galapagos and undelimited zones were removed from the sample. Finally, because the sample size was small in the provinces from the Amazon region, they were unified into a single group called Amazonia. The resulting data panel is perfectly balanced with 16 units (N) and 11 time periods (T), for a total of 176 observations (NxT).
It is common knowledge that informality and necessity-based self-employment are a major challenge in developing countries; Ecuador is no exception to this rule. For the purposes of this research, informal work was defined as jobs that are not subject to the country’s labour legislation. In Ecuador, one of the most consistent ways of measuring informality is through affiliation with social security. Figure 2 shows that informality (measured by social security) is strongly correlated with labour income. For the poorest decile, the rate of informal working is close to 80%, while for the highest income decile, informal work represents 25%. The same is true for self-employment (Figure 3), and even though the precise magnitudes and trends are different, both diminish as we move upward through the income distribution.

Concerning the real income of informal workers, Figure 4 shows a slight increase in the first eight deciles since 2007. This trend is reversed for the top two deciles of income. This dynamic suggests that the distribution of income of informal workers has compressed over the last ten years. On the other hand, self-employment income (Figure 3) shows a marked decrease for all deciles starting in 2014, the period in which oil prices plummeted. This indicates that the income of the self-employed is more sensitive to macroeconomic conditions than the income of informal workers.

Regarding inequality and unemployment, Figure 6 shows the relationship between poverty/extreme poverty and income inequality. Since 2007, both have shown a
Figure 3: Percentage of self-employed workers by income decile
Source: INEC, 2019.

Figure 4: Monthly real earnings of informal workers, by income decile
Source: INEC, 2019.
consistent downward trend. When compared with the real MW, there would seem to have been an inverse relationship since the latter has consistently increased. However, while increases in the MW and improvements in the enforcement of the law have achieved a compression of the distribution of income (Canelas, 2014; Guzman, 2018) a causal relationship cannot be inferred from these trends. Unemployment, much like self-employment, is strongly correlated with the economic cycle (Figure 7). Until 2014, unemployment dropped dramatically in the poorest deciles. But from 2015 onwards, the commodity crisis triggered a rise in unemployment to historically high levels.

To test Hypotheses 1 through 5 in the Ecuadorian labour market, a two-way fixed effects panel data regression was applied. The panel was built from household surveys conducted annually from 2007 to 2019. Only the economically active population (PEA) was considered, and the panel dataset was constructed at a province level. The standard fixed effects model is represented in the following equation:

$$Y_{it} = \beta_0 + \beta_1 \ln(MW_{it}) + f_p + f_t + \mu_{it}$$

Where $Y_{it}$ represents the outcome variable of interest in province $i$ and year $t$. $MW_{it}$ represents the MW for every unit and year, $f_p$ and $f_t$ are the province and time-fixed effects respectively, and $\mu_{it}$ the error term.

Nevertheless, this method applied to Ecuador poses an important problem because MW is set nationwide, that is, is the same for every industry, sector and region in the country, therefore, no individual variance exists. To overcome this issue, the independent variable must be replaced with a proxy that captures variations within entity and time. The MW bite is commonly used for this purpose and is defined as the ratio of the MW to a specific point in the income distribution (London Economics, 2016). In this case, it takes the following form:

![Figure 5: Monthly real own-account earnings by income decile](image)

Source: INEC, 2019.
Figure 6: Minimum wage, poverty and income inequality
Source: CEPALSTAT, 2019; CEDLAS, 2019; World Bank, 2019

Figure 7: Percentage of unemployed labour force by income decile
Source: CEPALSTAT, 2019; CEDLAS, 2019; World Bank, 2019
\[ MWBite^{70}_t = \ln(MW_t) - \ln(Income^{70}_t) \]

Where \( \ln(MW_t) \) is the natural logarithm of the MW in period \( t \) and \( \ln(Income^{70}_t) \) represents the percentile 70 of the income distribution in the same province and year. Percentile 70 was chosen because the MW is situated close to the 40th percentile for salaried income distribution and the 60th percentile for own-account income distribution. Therefore the 70th percentile, being above both classes of workers, should not be affected by any MW change made annually by the Ministry of Labour, creating a good reference point throughout the analysed period.

To further improve the robustness of estimation, a matrix of control variables \( X_{it} \) was included. This array consisted of: the percentage of women, self-identified ethnicity, level of education, branch of activity (1-digit CIIU8 classification), and occupation group (CIUO8 classification). The following equations correspond to each of the stated hypotheses in order:

\[
\begin{align*}
\%_{\text{informal employment}}^p_i &= \beta_0 + \beta_1 MWBite^{70}_t + \theta X_{it} + f_{it} + \mu_{it} \quad (1) \\
\%_{\text{self employment}}^p_i &= \beta_0 + \beta_1 MWBite^{70}_t + \theta X_{it} + f_{it} + \mu_{it} \quad (2) \\
\text{Informal income}^p_i &= \beta_0 + \beta_1 MWBite^{70}_t + \theta X_{it} + f_{it} + \mu_{it} \quad (3) \\
\text{self employment income}^p_i &= \beta_0 + \beta_1 MWBite^{70}_t + \theta X_{it} + f_{it} + \mu_{it} \quad (4) \\
\text{unemployment}^p_i &= \beta_0 + \beta_1 MWBite^{70}_t + \theta X_{it} + f_{it} + \mu_{it} \quad (5)
\end{align*}
\]

To test hypotheses 6 and 7, the specification of the explanatory variable was changed to the ‘fraction at’. This measure is defined as the percentage of people whose income is between ±10% of the MW (0.9 MW ≤ income ≤ 1.1 MW). It is widely used in the economic literature to capture the impact of the MW within the income distribution. By using this variable it is also possible to compare results to previous research (Lemos, 2009a; Canelos, 2014). Before estimation, the Levin-Lin-Chu test was used to determine the existence of unit roots in all variables. To correct for non-stationary variables, the first differences were applied. In addition, population weights provided by the ENEMDU were used in each estimation. The equations are as follows:

\[
W^p_{it} = \beta_0 + \beta_1 FrAt_{it} + \theta X_{it} + f_{it} + \mu_{it} \quad (6)
\]

Where \( W^p_{it} \) represents the real labour income for percentile \( p \) in province \( i \) for period \( t \). \( FrAt_{it} \) is the treatment variable and represents the MW proxy: ‘fraction at’. The same matrix of control variables \( X_{it} \) was also considered. Finally, unit and time-fixed effects were included.

For Equation 6, two distinct samples were used, each of which was tested without and with control variables. First, the sample was restricted only to salaried workers; given that MW policy targets this specific group this measure represents the direct impact of such policy. Second, the full sample was considered to test both the direct
and indirect effect of the MW among the whole income distribution. By considering both of these samples, it was possible to establish a possible spillover effect on the entire population.

Results

Table 1 shows the results of the applied models.

The first two columns show the effect of a MW increase on the proportion of informal and self-employed workers, respectively. Regarding the percentage of informal workers, the effect is positive but only significant for the first two deciles at 5%. A 10% increase in the MW would mean that the number of workers in decile 1 who work informally increases by 0.14 percentage points and in decile 2 by 0.28 percentage points. On the other hand, the effect on self-employment is also positive but only significant for the fifth decile at 5%. In this case, a 10% increase in the MW would mean that the number of workers in decile 5 who work for themselves increases by 11%. These results partially confirm hypotheses 1 and 2. However, the effect is very small and only affects specific deciles of the income distribution.

Columns 3 and 4 show the effect of MW on the earnings of informal and self-employed workers. Results from this model suggest that the MW policy is more likely to benefit informal workers and be detrimental to those who are self-employed.

On one hand, a 10% increase in the MW would mean that the workers in decile 1 who work informally increase their salary by $555.4 per year, in decile 2 by $461.7, in decile 3 by $329.7, in decile 4 by $266.9 in decile 5 by $239.9, in decile 6 by $222.8 and in decile 7 by $136.3. On the other hand, a 10% increase in the MW would mean that the workers in decile 1 who work for themselves decrease their incomes by $102.4 per year, in decile 2 by $138.2, in decile 3 by $71.9, in decile 4 by $67.8 in decile 5 by $88.6, in decile 6 by $86.8 and in decile 7 by $88.6. Finally, Table 2 shows the mean values of all income-dependent variables by decile in order to facilitate the visualisation of this effect in percentage terms.

Such findings indicate that hypothesis 3 cannot be rejected and hypothesis 4 can be rejected. Results also suggest that the so-called ‘lighthouse effect’ of the MW only applies in the case of informal workers, that is workers who receive a salary from an employer but are not affiliated with social security.

A plausible explanation for this behaviour could be that informal workers can use the MW as a point of reference to bargain wages with firms. Those who are self-employed, on the other hand, have no bargaining power over their wages as their income comes purely from work related to their labour activity and the market demand for their products and services.

As predicted by hypothesis 5, the rapid movement of displaced formal workers to informal/self-employment means that unemployment is unaffected. There is no effect on unemployment in any decile, suggesting that H5 cannot be rejected.

Estimates shown in the first two columns of Table 3 indicate that MW changes have no significant effect on income above the fifth decile. For salaried workers on the middle-level deciles (3 and 4), the effect is moderate and significant at a 10% level. Because MW is located near the 40th percentile, this result suggests that increases in the MW only affect the wages of workers earning close to the 40th percentile, probably due to a small spillover effect. Finally, the effect of the MW on
Table 1: Results of the estimation by fixed effects

<table>
<thead>
<tr>
<th>Equation</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>% Informal workers</td>
<td>% Self-employed</td>
<td>Informal Income</td>
<td>Self-employed Income</td>
<td>Unemployment</td>
</tr>
<tr>
<td>P10</td>
<td>0.014 **</td>
<td>0.016</td>
<td>5.554 ***</td>
<td>–1.024 **</td>
<td>–0.016</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.082)</td>
<td>(1.780)</td>
<td>(0.460)</td>
<td>(0.033)</td>
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<tr>
<td>P20</td>
<td>0.028 **</td>
<td>0.001</td>
<td>4.617 ***</td>
<td>–1.382 ***</td>
<td>0.018</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.084)</td>
<td>(1.298)</td>
<td>(0.314)</td>
<td>(0.028)</td>
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<tr>
<td>P30</td>
<td>0.038</td>
<td>0.065</td>
<td>3.297 ***</td>
<td>–0.712 **</td>
<td>–0.014</td>
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<tr>
<td></td>
<td>(0.074)</td>
<td>(0.074)</td>
<td>(1.258)</td>
<td>(0.305)</td>
<td>(0.025)</td>
</tr>
<tr>
<td>P40</td>
<td>0.012</td>
<td>0.050</td>
<td>2.669 **</td>
<td>–0.678 **</td>
<td>–0.003</td>
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<td></td>
<td>(0.069)</td>
<td>(0.090)</td>
<td>(1.059)</td>
<td>(0.317)</td>
<td>(0.037)</td>
</tr>
<tr>
<td>P50</td>
<td>–0.029</td>
<td>0.110 **</td>
<td>2.399 ***</td>
<td>–0.886 ***</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(0.061)</td>
<td>(0.052)</td>
<td>(0.849)</td>
<td>(0.292)</td>
<td>(0.039)</td>
</tr>
<tr>
<td>P60</td>
<td>0.054</td>
<td>0.020</td>
<td>2.228 ***</td>
<td>–0.868 **</td>
<td>–0.001</td>
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<tr>
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<td>(0.060)</td>
<td>(0.046)</td>
<td>(0.805)</td>
<td>(0.333)</td>
<td>(0.025)</td>
</tr>
<tr>
<td>P70</td>
<td>–0.029</td>
<td>0.080</td>
<td>1.363 **</td>
<td>–0.886 **</td>
<td>–0.011</td>
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<tr>
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<td>(0.091)</td>
<td>(0.074)</td>
<td>(0.678)</td>
<td>(0.349)</td>
<td>(0.030)</td>
</tr>
<tr>
<td>P80</td>
<td>–0.149</td>
<td>–0.051</td>
<td>0.423</td>
<td>–0.512</td>
<td>–0.029</td>
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<tr>
<td></td>
<td>(0.095)</td>
<td>(0.065)</td>
<td>(0.677)</td>
<td>(0.496)</td>
<td>(0.030)</td>
</tr>
<tr>
<td>P90</td>
<td>0.014</td>
<td>–0.091</td>
<td>0.240</td>
<td>–0.722</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>(0.094)</td>
<td>(0.081)</td>
<td>(0.803)</td>
<td>(0.481)</td>
<td>(0.024)</td>
</tr>
</tbody>
</table>

Source: Author’s elaboration.

Note: Significance levels at * p<0.1, ** p<0.05, *** p<0.01. Robust standard error in parentheses.

the poorest deciles (1 and 2) is largely attenuated by the prevalence of informality and necessity-based self-employment.

The nationwide estimation, shown in the last two columns of Table 2, suggests that, when considering the whole sample (formal, informal, self-employed), the MW policy has a significant spillover effect. This effect can possibly be explained by a lighthouse effect of the informal workers given that informal workers represent a significant proportion of the workforce and previous estimates suggest (H3) a positive income effect on this group.

Finally, a summary of the hypotheses and their results is shown in Table 4.
### Table 2: Average income per decile for the informal sector and self-employment

<table>
<thead>
<tr>
<th></th>
<th>Informal Income (mean)</th>
<th>Self-employed Income (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decile 1</td>
<td>94.6</td>
<td>83.8</td>
</tr>
<tr>
<td>Decile 2</td>
<td>165.7</td>
<td>143.6</td>
</tr>
<tr>
<td>Decile 3</td>
<td>199.3</td>
<td>175.0</td>
</tr>
<tr>
<td>Decile 4</td>
<td>224.2</td>
<td>206.2</td>
</tr>
<tr>
<td>Decile 5</td>
<td>249.6</td>
<td>238.0</td>
</tr>
<tr>
<td>Decile 6</td>
<td>275.9</td>
<td>279.4</td>
</tr>
<tr>
<td>Decile 7</td>
<td>311.1</td>
<td>330.7</td>
</tr>
<tr>
<td>Decile 8</td>
<td>361.5</td>
<td>404.1</td>
</tr>
<tr>
<td>Decile 9</td>
<td>473.7</td>
<td>555.2</td>
</tr>
<tr>
<td>Decile 10</td>
<td>800.7</td>
<td>954.8</td>
</tr>
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### Conclusion

Traditionally, MW policy has been used as a tool to reduce poverty and inequality. In an ideal scenario, companies obliged to comply with the legislation would compensate for the increase in their workers’ wages with improvements in productivity. Increases in the income of the lower deciles would stimulate demand, which would lead to a better performance of the economy through the spillover effect. Alternatively, companies that could not support the increase in the MW, would be forced to lay off workers or go out of business, displacing some workers to unemployment who in turn would be able to collect unemployment insurance until they could find a new job if they wanted to remain employed, or begin the process of starting up a business (entrepreneurship self-employment).

In Ecuador, as in many other Latin American countries, labour law is not strictly enforced. As a result, employers do not necessarily increase the wages of their workers according to the MW. Another important factor that prevents the ideal scenario is that productivity levels are very low, especially in the traditional sectors where most of the low-income workforce is located. This implies that there is little room for productivity improvements that would allow a firm to absorb the increase in the MW, suggesting that firms would either lay off employees or break the law and pay lower wages.

Although the increase in the MW does not directly influence the incomes of the salaried worker from the lowest deciles, it is in practice a reference point that allows informal workers to negotiate for better wages, in what is known as the ‘lighthouse effect’. Such an effect does not seem to apply to self-employed workers as their income comes exclusively from the demand for their provided product/services.

Regarding the possibility of collecting unemployment insurance in the event of dismissal due to MW increases, in Ecuador this is not a viable possibility because the state does not provide any type of support to the unemployed. Workers who have lost their jobs will occupy the jobs that are offered to them, mostly in informal conditions. Those who have no place in the labour market as employees, even under informal conditions, may start their own businesses out of necessity, giving
rise to necessity-based self-employment. Ecuadorian legislation related to the legalisation and registration of companies is very lax, so starting a business does not involve any type of bureaucratic procedure, thus facilitating the creation of informal businesses.

The context of the Ecuadorian labour market explains the results of this work. The increase in the MW in Ecuador, between 2007 and 2017, was translated into a small reduction in poverty and inequality. Increases in the incomes of the lowest deciles were

<table>
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<th>Dependent variable</th>
<th>Fraction-at</th>
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<tr>
<td>Sample</td>
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<td>Controls</td>
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Table 3: Results of the estimation by fixed effects

<table>
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<tr>
<td></td>
<td>H6/H7</td>
<td>H6/H7</td>
<td>H6/H7</td>
<td>H6/H7</td>
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<tr>
<td>Dependent variable</td>
<td>Salary income</td>
<td>Salary income</td>
<td>Labour income</td>
<td>Labour income</td>
</tr>
<tr>
<td>P10</td>
<td>1.900</td>
<td>1.380</td>
<td>2.530 ***</td>
<td>3.240</td>
</tr>
<tr>
<td></td>
<td>(1.310)</td>
<td>(1.440)</td>
<td>(0.700)</td>
<td>(0.770)</td>
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<td>P20</td>
<td>1.540</td>
<td>0.790</td>
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<td>(1.050)</td>
<td>(1.170)</td>
<td>(0.570)</td>
<td>(0.620)</td>
</tr>
<tr>
<td>P30</td>
<td>1.900 **</td>
<td>1.540 *</td>
<td>1.280 ***</td>
<td>1.700</td>
</tr>
<tr>
<td></td>
<td>(0.810)</td>
<td>(0.860)</td>
<td>(0.440)</td>
<td>(0.470)</td>
</tr>
<tr>
<td>P40</td>
<td>1.900 ***</td>
<td>1.460 *</td>
<td>1.110 **</td>
<td>1.450</td>
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<td>(0.710)</td>
<td>(0.750)</td>
<td>(0.390)</td>
<td>(0.410)</td>
</tr>
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<td>P50</td>
<td>1.260 **</td>
<td>0.800</td>
<td>0.570 *</td>
<td>0.860</td>
</tr>
<tr>
<td></td>
<td>(0.570)</td>
<td>(0.620)</td>
<td>(0.310)</td>
<td>(0.340)</td>
</tr>
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<td>P60</td>
<td>0.550</td>
<td>0.070</td>
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<td>(0.270)</td>
<td>(0.290)</td>
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<tr>
<td>P70</td>
<td>0.280</td>
<td>−0.210</td>
<td>−0.120</td>
<td>0.180</td>
</tr>
<tr>
<td></td>
<td>(0.470)</td>
<td>(0.510)</td>
<td>(0.260)</td>
<td>(0.270)</td>
</tr>
<tr>
<td>P80</td>
<td>0.140</td>
<td>−0.340</td>
<td>−0.200</td>
<td>0.075</td>
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<td>(0.540)</td>
<td>(0.570)</td>
<td>(0.290)</td>
<td>(0.310)</td>
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<tr>
<td>P90</td>
<td>0.035</td>
<td>−0.290</td>
<td>0.004</td>
<td>0.220</td>
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<tr>
<td></td>
<td>(0.550)</td>
<td>(0.580)</td>
<td>(0.300)</td>
<td>(0.310)</td>
</tr>
</tbody>
</table>

Source: Author’s elaboration.

Note: Significance levels at * p < 0.1, ** p < 0.05, *** p < 0.01. Robust standard error in parentheses.
mainly responding to the ‘lighthouse effect’ of the MW on the incomes of informal workers, who formed the majority in these groups. We also observe that the increase in the MW did not translate into an increase in unemployment, but rather into an increase in informal work and self-employment.

Considering the results obtained and considering the structure of Ecuador’s economy in general, and its labour market in particular, it is worth reviewing the use of the MW increase as an economic policy to reduce poverty and inequality.

As in the rest of the region, attention has continually been drawn to the capacity of the MW to act as a tool when in reality it is of very limited importance. The MW nevertheless continues to occupy a prominent position in the dialogue around poverty and inequality in the region, although it is long overdue to be relegated to the more traditional secondary role that it should in fact occupy.

This is due to the influence of social dialogue in the labour market framework in high-income countries, where the MW does have a greater capacity to influence the labour market. Nevertheless, MW data has been among the most developed in the region, which has led to a remarkable number of research projects on this topic, compared to other key areas in the labour market.

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REFERENCES

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<tr>
<th>№</th>
<th>Hypothesis</th>
<th>Criteria</th>
<th>Result</th>
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<tr>
<td>1</td>
<td>Positive effect on informal rate in LD</td>
<td>Partially confirmed</td>
<td>Positive effect, but only significant on first two deciles</td>
</tr>
<tr>
<td>2</td>
<td>Positive effect on self-employment rate in LD</td>
<td>Partially confirmed</td>
<td>Positive effect, but only significant in decile 5</td>
</tr>
<tr>
<td>3</td>
<td>Low increase of informal workers’ wages in LD</td>
<td>Confirmed</td>
<td>Positive and significant effect for the first 7 deciles. Possible ‘lighthouse’ effect</td>
</tr>
<tr>
<td>4</td>
<td>Low increase in self-employment income in LD</td>
<td>Rejected</td>
<td>Negative and significant effect for the first 7 deciles</td>
</tr>
<tr>
<td>5</td>
<td>No effect on unemployment in LD</td>
<td>Confirmed</td>
<td>Non-significant effect</td>
</tr>
<tr>
<td>6</td>
<td>Mild reduction in poverty</td>
<td>Partially confirmed</td>
<td>Mild compression in income distribution, low deciles increase their wages while upper deciles remain unchanged. The direct effect of the MW is only significant for deciles 3 and 4</td>
</tr>
<tr>
<td>7</td>
<td>Mild inequality reduction</td>
<td>Partially confirmed</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s elaboration.


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