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Does the elimination of work flexibility contribute to reducing wage inequality? Empirical evidence from Ecuador

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From the empirical point of view, measures that promote work flexibility increase income inequalities and unemployment rates in the long-term, as well as promoting employment precariousness and the informality of the labor sector. The objective of the present work is to investigate the effect on wage inequality of eliminating work flexibility, which was undertaken in Ecuador in 2008. A two-way effect econometric model was applied with panel data. Data from the 21 provinces of Ecuador covering the period of 2007 – 2018 were obtained from the National Employment, Unemployment and Under-Employment Survey (ENEMDU) of the National Statistical and Census Institute (INEC). The results suggest that the elimination of work flexibility had a significant and negative effect on inequality; the policy was effective in reducing inequality. This result is significant for all the years subsequent to the introduction of these measures, although with variations according to regional and economic characteristics. Policies aimed at reducing inequality should focus on improving workers' bargaining power and on generating an environment that favors increasing levels of formality.

Key words: Income inequality, Work flexibility, Economic Policy, Panel data, Ecuador.

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1 Introduction

Development policies in many countries have in recent years been oriented mainly to improving the wellbeing of their populations. In the framework of this objective, the reduction of inequality is a priority, above all if we consider that inequality is a social and economic problem that persists in the context of the growing capacity of economies to generate wealth

Wage incomes constitute the main source of household resources in Latin America, and consequently represent a decisive element in the configuration of unequal distribution, as well as being the object of analysis in the development of policies aimed at mitigating the problem (Fernández Aráuz and Del Valle Alvarado, 2011). According to the UN Economic Commission for Latin America and the Caribbean (ECLAC, 2019), inequality among households and individuals has decreased significantly in Latin America and the Caribbean since the year 2000. Despite this, Latin America continue to be the region with the highest levels of income inequality in the world. As well, the average Gini coefficient (representing the level of income inequality) for all Latin American countries is almost a third higher than those of Europe and central Asia. The Gini coefficient decreased on average in Latin America from 0.543 in 2002 to 0.466 in 2017. However, the rate of decrease has slowed down in recent years. The coefficient decreased by 1.3 percent between 2002 and 2008, by 0.8 percent between 2008 and 2014, and by only 0.3 percent between 2014 and 2017.

In this scenario, the construction and introduction of policies, as well as the active participation of governments, are key to mitigating levels of inequality. Several measures or policies have been implemented in Ecuador in the last 15 years aimed at reducing wage inequalities. Through Executive Decree 1121, the Ecuadoran National Constituent Assembly in 2008 prohibited all kinds of employment contracts that promote "precarious employment", defined as outsourcing[1], the use of intermediaries[2] and hiring by the hour. As well, companies that had outsourced or contracted out employees were forced to hire them directly for at least one year (Albornoz et al., 2011). However, the levels of inequality have not decreased significantly. According to ECLAC (2019), the Gini coefficient for Ecuador decreased by 0.5 percent per annum between 2014 and 2017, which was below the mean of the 13 Latin American countries analyzed. Similarly, according to the INEC (2019) Report on Poverty and Inequality, the Gini coefficient at the national level was 0.478, 0.462 for urban areas, and 0.432 for rural areas. Changes since 2018 have not been statistically significant.

Kuznets´ (1955) provides a solid theoretical framework to analyze wage inequality. According to this hypothesis, inequality first increases at the beginning of economic development, as economic activity gradually passes from rural to industrial sectors (transfer of labor from the least to the most productive sector). Once most of the workforce is

[1] According to the International Labor Organization (ILO, 2017), outsourcing is defined as: contracting one or more workers by means of a third party, the latter does have a direct employment contract with the individual or firm that seeking workers.

[2] A type of labor contract that where, in contrast to outsourcing, both the contracting firm and the labor supplier have authority over the employee.

occupied in the industrial sector, the hypothesis argues inequality decreases. Therefore, the theory allows for incorporating the analysis of the policy aimed at reducing wage inequality introduced in Ecuador in 2008.

Work flexibilization policies (WFP) have allowed businesses to significantly raise their levels of productivity, in particular among firm in the industrial sector (Anwar et al., 2013; Yamashita, 2010; Ballina, 2015; Ponce et al., 2019). Kaplan, 2009 and Basu, 2018 argue that the importance of these policies lies in increased information flows, reduced costs and increased profit levels, while at the same time workers gain labor market mobility. In contrast, D'Agostino et al. (2018) argue that firm increase the number of temporary contracts when the labor market becomes more flexible, which leads to a decrease in the levels of informality and a gradual increase in inequality. This suggests that modifying the WFP can have two effects, on the one hand, on the economic growth of firms that assimilate these measures, and the other related to the level of inequality among workers. In this context, the objective of this investigation is to examine the effect of eliminating work flexibility undertaken in 2008, on the levels of wage inequality in Ecuador and by groups of provinces during the period 2007-2018, with the aim of evaluating the effectiveness of the policy. The study supports the hypothesis that the elimination of work flexibility policies is negatively related to income inequality.

This investigation contributes to the literature that relates WFP to the level of inequality. Thus, the research provides sufficient evidence to argue that the elimination of work flexibility improves workers' incomes and the efficient functioning of the labor market. From the point of view of economic development, the elimination of WFP improves the quality of life of people since they have greater monetary resources to cover their needs. Authors such as Albornoz et al. (2011), Gaussens (2016) and Albuja-Echeverría and Enríquez-Rodríguez (2018) have analyzed the modification of WFP and the possible impact of this on indicators of poverty and inequality based on statistical information, without considering an econometric analysis. In contrast, the present investigation used the econometric techniques of two-way effects with panel data, by means of a binary variable that captures the effects over time following the introduction of the policy. First, Kuznets' inverted U hypothesis was estimated globally for all of Ecuador, without considering differences among provinces. The hypothesis was then analyzed by province, with the provinces classified according to the level of income considering the World Bank Atlas method 2017: high income provinces (HIP), medium-to-high income provinces (MHIP) and medium-to-low income provinces (MLIP). As well, the analysis was applied according to the three regions of Ecuador (internal division of the provinces), Coast, Andes and Amazon.

The article is structured in the following manner. Following the introduction, the second section presents a literature review based on theoretical and empirical investigations that address similar questions in different countries or groups of countries. The methodology used is described in Section Three and an econometric strategy is proposed that seeks a response to the research hypothesis. The fourth section discusses the results with the theory and the empirical evidence. In closing, the last section presents the conclusions and policy implications of the investigation.

2 Literature review

Classical and neoclassical economic thought (Hicks, 1937; Samuelson and Solow, 1960; Pelphs, 1972; among others) argue that it is in the labor market that levels of employment are determined as the result of the decision of every to individual to maximize his/her own benefits, on the one hand, that of consumers about utility (level of consumption of goods and services), and on the hand, that of business owners about their levels of profits. Thus, workers offer their labor to the point that the marginal utility of leisure equals the benefit of working, and employers demand labor until its cost equals its marginal productivity.

Given the dynamic generated in labor markets, it is necessary to analyze the effects of the WFP. In this context, the empirical evidence found by the researchers is divided into two groups. Firstly, there are works that consider the WFP positively, from the point of view of the profits of companies (Anwar et al., 2013; Arredondo Trapero et al., 2013; Tinoco and Lugo, 2015). Secondly, there are works that address the effect of these policies in making employment gradually more precarious and in increasing inequality (Loria Diaz De Guzman et al., 2015; Lezama Rodríguez, 2014; Nieto, 2017). Labor reforms focused on flexiblization significantly increased the level of productivity of firms, in particular those in the industrial sector, by means of subcontracting intermediate activities, as noted by Kaplan, 2009, Yamashita, 2010, Anwar et al., 2013, Ballina, 2015 and (Basu, 2018), who have argued that their importance lies in increased information flows, reduced costs and increased profits, while workers gain job mobility within the sector.

In a study of the countries that make up the European Economic and Monetary Union (EMU), Bertola (2016) showed that there is a positive relationship between a flexible labor market and the degree of human welfare. However, these results only apply in countries with a concentration of capital. The application of this type of measure in the labor market correlates significantly with the probability of: (i) the pre-existing institutional level of the labor market; (ii) the degree of decentralization of the executive power; and (iii) how long the chief executive has been in power. With this form of application, it is more likely to be accepted by the individuals that make up the market (Bernal-Verdugo et al., 2013). Likewise, this type of measure notably reduces unemployment in the short term by increasing the levels of mobility among unskilled workers s (Agnello et al., 2014; Raman and Aldana, 2016; Arredondo Trapero et al., 2013; Bartóková and Gontkovičová, 2014; Beissinger et al., 2016; Bauer and King, 2018). Gehrke and Weber, 2018 had a similar conclusion, suggesting that unemployment decreases after the application of labor market reforms. These results are favorable in periods without recession, while in the context of recession, the costs for the public sector can be very high.

According to García and Cruz (2017), Latin America has been witness to a rare occurrence, a sustainable reduction in the unemployment rate, accompanied by a series of job flexibilization measures introduced in the 1990s, along with a significant increase in capital accumulation. The entry into the labor market of women with very low levels of education, through part-time jobs or other flexibility measures, allowed for the link

between home and work to not affect women's work activities, resulting in increased productivity, which generated growth in the production of companies, highlighted by what they call "modern" trends in labor markets (Fernández Aráuz and Del Valle Alvarado, 2011; Tinoco and Lugo, 2015).

Using a breakdown of the flexibility index of the Federal District of Mexico, Ballina (2015) found that the activities with the highest levels of subcontracting were construction, computer services, travel agencies, and technical and professional services. These practices increase because companies discard secondary activities that are not directly related to focus on the activities that produce the most benefits. Following the same idea, Baatartogtokh et al. (2018) surveyed 58 Canadian mining companies and determined that outsourcing ceases to be a national activity, to seek greater benefits abroad, thus creating flexible and adaptive organizations that consist of networks of poorly integrated suppliers. Mining companies also access skills and knowledge where they lack experience. Despite the benefits of subcontracting, the authors found that this activity generates uncertainty because the objectives of service providers are unclear (Vaxevanou and Konstantopoulos, 2015).

As noted above, the second group is composed of studies that take the view that the WFP contributes to a gradual increase in the precariousness of employment and to an increase in inequality. Based on a co-integration analysis, Loria Diaz De Guzman et al. (2015) found a positive relationship between economic growth and the unemployment rate. Interestingly, the policies introduced to promote growth are directed at labor flexibility, unlike what previous authors have proposed, these measures led to a notable increase in unemployment rates, a condition that results in employers protecting their profitability through temporary contracts. Through a panel data study, D'Agostino et al. (2018) determined that work flexibility policies introduced in Italy between 2003 and 2010 reduced workers' negotiating capacity, which allowed companies to increase the number of temporary contract to almost 7 percent of all jobs. Poorly directed WFP lead to such high levels of precariousness that many workers prefer to voluntarily move into the informal sector (sector consisting of self-employed workers or small businesses not regulated by the constitutional framework), where they enjoy a certain level of autonomy level (Hernández Laos, 2015; Iglesias, 2014; Ruesga et al., 2014). According to Horvath and Zhang (2018), flexibilization reduces the creation of networks among workers, increasing the levels of inequality among them. This decrease is related to the availability of jobs, leading to active participation in the informal market.

According to Lezama Rodríguez (2014), the labor market in Mexico is flexible and as a consequence factors like schooling, experience and gender equality are not considered, which increases the probability of accessing the labor market and escaping conditions of informality. However, the population groups most affected by this type of measure are youths because of their low level of qualification, women owing to social discrimination and immigrants because of their legal status within the economy.

In an analysis of the Hartz policies (reforms to reduce employment, work flexibility and labor incentive) introduced in Germany in 2002, Bradley and Kügler (2019) showed that these reforms shortened the typical duration of unemployment, did not reduce unemployment as a whole and led to wage decreases. Poorly qualified workers suffered

more in terms of employment and lost wages. In addition, emphasis is placed on the limited access these groups have to benefits, social security and unemployment insurance, among others. The loss of this type of unemployment compensation sharpens wage gaps (de Pedraza et al., 2015; Sánchez-Castañeda, 2014; Benacha et al., 2015; Albuja-Echeverría and Enríquez-Rodríguez, 2018).

Kugler and Adriana (2004), after applying a difference model to analyze the reforms applied in Colombia in 1990 that reduced the costs of job layoffs, they found that they allow the turnover of workers to be higher among the youngest, with higher level of education and those hired in larger companies, causing unemployment to drop by 10% in the three subsequent years. However, a more current look shows the major problems that Colombia presents in its labor market, since more than 60% work in companies made up of five employees, which highlights the problem of informality and precarious working conditions. Likewise, between 76% and 90% of workers have seasonal and occasional jobs, a percentage that varies by group and period, but is higher among women Ramoni Perazzi and Orlandoni Merli, 2017. On the other hand, a study carried out by Miozzo and Grimshaw (2008) in Argentina and Brazil, reveals that the entry of multinationals would increase the levels of subcontracting, which forces national companies to adopt this type of contracting, resulting in a decrease of the contribution of local companies to household income and therefore to the economy.

Nieto (2017), efforts to increase employment in Mexico through a work flexibility policy did not reduce economic gaps nor did it strengthen the labor market, but it did reduce household incomes. Parallel to this, through a segmentation of the Gini coefficient, Aldana and Rodríguez (2013) found that outsourcing increases wage inequality significantly. The authors also noted that these types of measures focus on less attractive jobs, specifically those in the Mexican manufacturing sector. Workers increase job security with time despite the application of flexibility measures and workers with less seniority face possible layoffs due to these measures. These have similar effects on less skilled workers. In summary, in the context of job flexibilization, job stability depends on seniority and the level of qualification, (Geishecker, 2008; Castelao Caruana, 2016).

According to Gaussens (2016) job precarization was not limited to the private sector in Ecuador in the 2000s, due to the normalization of layoffs. Despite the efforts to improve the labor market, the capacities and mobility of the working class has been affected. The effects found by the aforementioned authors are replicated in the Ecuadoran economy. Women are most affected group by these measures, leading to an environment in which women look for less notable jobs, thus widening the gap between men and women (Posso, 2016). The investigation proposes examining the effects on income equality of measures undertaken in Ecuador in 2008 to eliminate all forms of don income inequality.

3 Data and methodology

3.1 Data

With the aim of making an empirical analysis of the effects of WFP, we drew upon data from the National Survey on Employment, Unemployment and Underemployment (EN-

EMDU, 2019), conducted by the National Institute for Statistics and Censuses (INEC, 2019) and Gross Value Added (GVA) data from the Central Bank (2019). The investigation covers 21 Ecuadoran provinces[3] in the period 2007 – 2018.

The dependent variable of wage inequality in the econometric regressions is understood as the difference in wage incomes. This investigation employed the Gini coefficient as a measurement, which according to Yuan et al. (2017) is expressed as follows:

$$Gini : 1 - \sum_{i=1}^{n} (X_i + X_{i-1})(Y_i + Y_{i+1}) \tag{1}$$

where n represents the number of groups, X_i is the accumulated percentage of the population in group i; Y_t is the accumulated percentage of incomes in group i. The result is a percentage between 0 and 1, where 0 represents the absence of inequality and 1 is maximum inequality. The independent variable is the GVA logarithm as a measure of production. As well, control variables were used that characterize the labor force, such as the unemployment rate, the levels of informality, experience, and poverty, and the economic sector to which workers pertain.

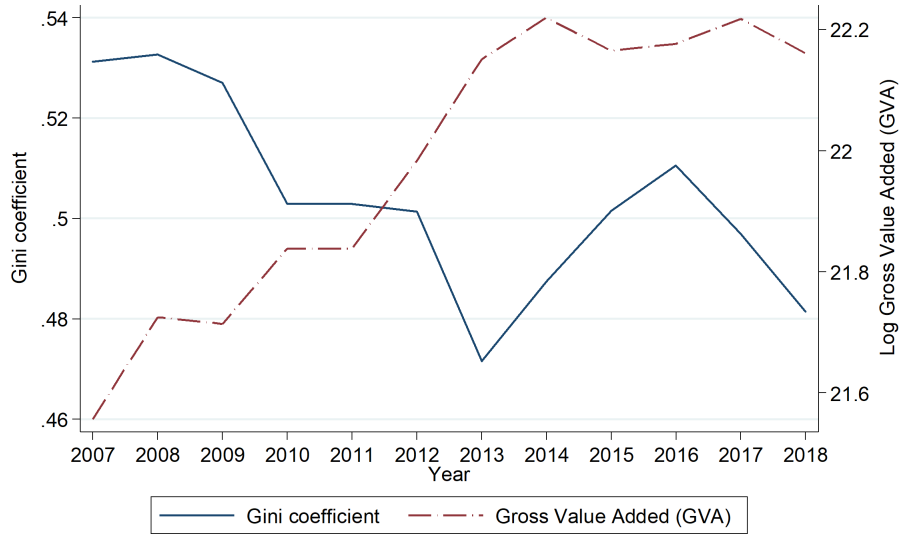

Figure 1: Evolution of the Gini coefficient and the GVA
Source: The authors based on data from ENEMDU (2019) and BCE (2019)

Figure 1 shows the temporal evolution of the Gini coefficient and the GVA logarithm as the annual average of the 21 provinces. The two variables had contrasting tendencies over the studied period. The average Gini coefficient and the GVA logarithm by province for the period 2007 –2018 had opposite behaviors in that as the GVA increased, the Gini

[3]The provinces of Santa Elena, Santo Domingo de los Tsáchilas and Galápagos were not considered because of lack of data.

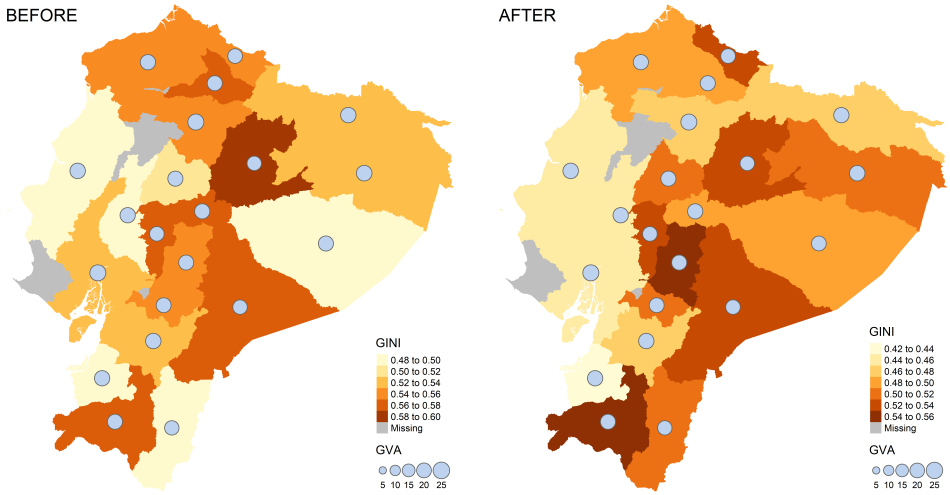

Figure 2: Evolution of the Gini coefficient and the GVA
Source: The authors based on data from ENEMDU (2019) and BCE (2019)

coefficient decreased, without considering 2015 and 2016, which were a period of crisis owing to the fall in the price of oil.

Using the average values of the Gini coefficient and the GVA logarithm as measures of the impact of theoretical base, Figure 2 shows graphically the effects of the policy in 2008, comparing the period before and after its application. A low level of economic growth, represented by green circles, can be observed when the Gini coefficient is highest in both maps, as indicated by the darkest shading color, r the coefficient decreases with economic growth following the application of the policy. However, the Amazon region had the highest levels of inequality following the introduction of the measures. Similarly, there was no advance in the economic growth of the Amazonian provinces, despite the high level of exploitation of natural resource exploitation that characterizes this region.

Table 1 describes the variables used in this research, as well their definitions, means and standard deviations. The Gini coefficient was constructed based on information from the National Survey on Employment, Unemployment and Underemployment (2019) for each of the 21 provinces. The empirical evidence described above considers the Gini coefficient to measure change in the inequality of workers' incomes resulting from the introduction or elimination of WFP.

The GVA logarithm was used as a measure of economic growth that captures of changes in productive activities and increased development, a variable used in the recent analyses of Nieto (2017) and Gehrke and Weber (2018). Hernández Laos (2015) used the concept of labor informality to study the effect of job insecurity on inequality, this variable in turn provides information on the behavior of workers in this sector. The

variable not poor considers the opposte effect of poverty, which distinguishes between people who have incomes and can expand their consumption capacity. This variable, which was used as a proxy of the investigation of Bernal-Verdugo et al. (2013), determines the impact of introducing the WFP on household consumption. The secondary and tertiary sectors were used as variables that indicate the effects of flexibilization given that these sectors have the greatest propensity to generate precarious employment, as described in the previous section. Finally, the population without contract provides

Table 1: Variables: definition and descriptive statistics

Variable	Description	Mean	S.D.
Gini coefficient	Values between 0 and 1, in which 0 is perfect equality and 1 is perfect inequality	0.503	0.044
Log (GVA)	Gross added value by province at 2007 prices	21.239	1.209
Unemployment rate	Persons without employment as a percentage of the total population	2.361	1.274
Informality	Persons in the informal sector as a percentage of the total population	40.287	8.901
Not poor	Persons that are not considered poor as a percentage of the total population	73.033	9.311
Tertiary sector	Person employed in the tertiary sector as a percentage of the total population	51.632	11.970
Secondary sector	Persons employed in the secondary sector as a percentage of the total population	6.332	4.661
Without contract	Persons without an employment contract as a percentage of the total population	29.447	9.837
Policy WFP	Represents the political variable. It takes value of 1 the for the years in which the policy is in force and 0 otherwise.	0.833	0.373

Note: S.D. = Standard Deviation

information about persons that work without short or long-term economic security. This variable was used to measure the progress of contracting based on the application or elimination of WFP, as proposed by Lezama Rodríguez (2014), de Pedraza et al. (2015), Kaplan (2009), and Yassin and Langot (2018).

3.1.1 Econometric strategies

The objective of the present research is to demonstrate the effect on wage inequality of eliminating work flexibility. Initially, compliance with Kuznets' inverted U hypothesis

1955 between economic growth and income inequality was verified, because a development policy is associated with economic growth. This relationship is formalized in Equation 2, with a base regression with panel data:

$$Gini_{it} = \delta_0 + \delta_1 logVAB_{it} + \delta_2 log(VAB)^2_{it} + \epsilon_{it} \quad (2)$$

Where $Gini_{it}$ represents the Gini coefficient, $logVAB_{it}$ represents the logarithm of the level of production in dollars at constant prices, $log(VAB)^2_{it}$ is the square of GVA logarithm and represents the error term of province $i = 1, 2, ..., 21$ in the period $t = 2007, 2008, ..., 2018$. Equation 3 is then generated with the aim of assessing the effect of policy:

$$Gini_{it} = \delta_0 + \delta_1 logVAB_{it} + \delta_2 logP_{it} + \delta_3 Z_{it} + \epsilon_{it} \quad (3)$$

Unlike Equation 2, Equation 3 incorporates the binary variable P_{it}, which captures the effect before and after the application of the policy, with a value of 0 for the years before the policy was introduced, $t = 2007y2018$ and 1 for the years since the policy was introduced $t = 2009, 2010, ..., 2018$. The variable Z_{it} , which is a vector and represents all the control variables detailed in Table 1, was included to improve the robustness of the estimators. An important element in panel data models is the choice between a fixed effect model (FE) and a random effect model (RE). The application of the Hausman test (1978) establishes that there is a difference between the coefficients obtained by fixed and random effects ($\beta FE - \beta RE$) in all the regressions. Therefore, the models with fixed effects are estimated, whose estimators tend to be consistent (Hausman and Taylor, 1981). Through the Wooldridge test (2002), autocorrelation and heteroscedasticity problems were detected in the econometric models described, which were solved by estimating generalized least squares (GLS).

4 Discussion of the results

This section presents the results of the regressions from Equations 2 and 3 for 21 Ecuadoran provinces. This section presents the results of the regressions from Equations (2) and (3) for the 21 provinces of Ecuador. In Table 3, 4 and 5, the Hausman test (1978) test was applied to choose between a fixed effects model and a random effects model (according to the standard deviations of the panel). Consequently, the model most consistent with the results of the test was the fixed effects model (0.0055). In addition, the Wald test to detect heteroskedasticity and the Wooldridge (1991) to detect autocorrelation in the panel, point out the need to estimate the parameters of equations (2) and (3) using generalized least squares (GLS) for panel data (Wooldridge, 2002)

First, the Kuznets Reversed U hypothesis is validated globally and according to the income levels of the regions of Ecuador. Table 2 shows the results of Kuznets' hypothesis, in which the hypothesis is rejected globally for Ecuador. The provinces were grouped according to their level of income using the World Bank Atlas Method 2017, in the same way for HIP, MHIP and MLIP the hypothesis was rejected, which was associated with Ecuador being a developing country located on the positive slope of the Kuznets curve.

Table 2: Kuznets' relationship

	Global	HIP	MHIP	MLIP
Log(GVA)	-0.00290	-0.874	0.0891	0.530**
	(-0.04)	(-0.77)	(0.37)	(2.85)
$Log(GVA)^2$	-0.000316	0.0197	-0.00227	-0.0132**
	(-0.18)	(0.76)	(-0.43)	(-2.95)
Constant	0.709	10.19	-0.370	-4.784*
	(0.88)	(0.82)	(-0.14)	(-2.47)
Observations	252	24	84	144

Note: *, **, *** denotes the statistical significance at 5%, 1% and 0.1%, respectively, the t statistic is between parenthesis

Table 3 shows that economic growth, as measured by the GVA logarithm, has a negative and statistically significant effect on inequality. It is evident that the relationship between the two variables cannot be significant, this can be seen in Table 4, in which, when including control variables and considering the region, the level of income of each group of provinces, the result of growth over the inequality loses significance, as will be analyzed later. This result can be associated with the fact that economic growth alone does not explain changes in inequality levels, however, according to García and Cruz (2017), maintaining growth through instruments that stimulate effective demand is the key to reduce unemployment and inequality levels, thus increasing the degree of participation of workers. Similarly, growth that favors reducing inequality levels has to be accompanied by police officers that reduce the level of flexibility in labor markets (Nieto, 2017).

With respect to the policy variable, the elimination of the job flexibilization policy had a significant effect on wage inequality reduction. In other words, the salary conditions of workers have improved since the implementation of the policy. These results allow to confirm the fulfillment of the hypothesis of the study. The elimination of labor flexibility policies are negatively related to income inequality. The policy introduced in 2008 to eliminate any type of job flexibilzation had a significant negative effect on inequality in all the years after its introduction, that is, the policy was effective in reducing inequality in the period following its introduction. Relating the high levels of inequality to the increase in labor precariousness resulting from the WFP suggests that the elimination of these measures will provide workers are granted a negotiation and extension of advantages, to increase their incentives and reduce inequality (Yamashita, 2010; Horvath and Zhang, 2018; Bradley and Kügler, 2019; D'Agostino et al., 2018). The effect of the policy has been the same for the three regions Coast, Andes and Amazon). However, the policy was not significant in MLIP (see Table 4). This result could be related to the level of qualification of workers, where they are indifferent to the characteristics offered by the labor market and their main incentive is to have a source of income, which allows them

Table 3: Relationship between the Gini coefficient and the GVA, with control variables

	M1	M2	M3	M4	M5	M6	M7	M8
Log (GVA)	-0.016***	-0.016***	-0.02***	-0.015***	-0.004	-0.005*	-0.0076**	-0.008***
	(-6.15)	(-6.62)	(-7.09)	(-5.69)	(-1.71)	(-2.06)	(-2.93)	(-3.29)
Policy WFP		-0.031***	-0.032***	-0.031***	-0.020***	-0.017**	-0.014**	-0.018***
		(-5.68)	(-6.28)	(-6.23)	(-3.90)	(-3.26)	(-2.68)	(-3.44)
Unemployment rate			0.0061***	0.0072***	0.0045**	0.0037*	0.0039*	0.004*
			(3.83)	(4.66)	(2.87)	(2.23)	(2.32)	(2.49)
Log(Informal)				0.0256*	0.00690	-0.00779	-0.0102	0.00728
				(2.48)	(0.66)	(-0.69)	(-0.92)	(0.65)
Log (Not poor)					-0.189***	-0.206***	-0.198***	-0.206***
					(-9.22)	(-9.59)	(-9.34)	(-10.00)
Log (Tertiary sector)						0.0233**	0.00839	0.044***
						(2.68)	(0.87)	(3.65)
Log (Secundary sector)							0.0109**	0.0105**
							(2.97)	(2.92)
Log (Without a contract)								-0.042***
								(-5.40)
Constant	0.858***	0.855***	0.873***	0.733***	1.388***	1.443***	1.51***	1.49***
	(14.80)	(17.28)	(17.39)	(9.46)	(13.30)	(13.84)	(14.25)	(14.39)
Observations	252	252	252	252	252	252	252	252

Note: *, **, *** denotes the statistical significance at 5%, 1% and 0.1%, respectively, the t statistic is between parenthesis

Table 4: Relationship between the Gini coefficient and the GVA with control variables

	Region			Income level		
	Coast	Andes	Amazon	HIP	MHIP	MLIP
Log (GVA)	0.000731	0.000541	-0.00149	0.0129	-0.00494	-0.00382
	(0.12)	(0.12)	(-0.43)	(1.70)	(-1.63)	(-0.85)
Policy WFP	-0.023*	-0.015*	-0.026**	-0.037***	-0.027***	-0.00495
	(-2.18)	(-2.51)	(-2.87)	(-4.70)	(-3.77)	(-0.70)
Unemployment	0.004	0.007**	0.008***	0.010***	0.003	0.005*
rate	(1.33)	(2.64)	(3.41)	(4.31)	(1.08)	(2.03)
Log	-0.0269	0.0167	0.0328	-0.0387	-0.0558*	0.00252
(Informal)	(-0.89)	(1.31)	(1.65)	(1.90)	(-2.48)	(0.16)
Log	-0.212***	-0.234***	-0.221***	-0.279***	-0.279***	-0.213***
(Not poor)	(-4.97)	(-9.29)	(-6.55)	(-6.55)	(-7.77)	(-7.76)
Log	0.0140	0.0392*	0.0393	0.0750**	0.0334	0.010***
(Ter. sector)	(0.57)	(2.24)	(1.95)	(3.00)	(1.53)	(4.21)
Log	0.00850	-0.00106	0.00225	0.0275*	0.033***	0.00557
(Sec. sector)	(0.68)	(-0.24)	(0.31)	(2.10)	(6.30)	(1.11)
Log	-0.0206	-0.0218	-0.0190	-0.0478*	-0.0310**	-0.054***
(without cont.)	(-1.04)	(-1.87)	(-1.18)	(-2.39)	(-2.75)	(-5.01)
Constant	1.474***	1.370***	1.259***	1.380***	1.922***	1.392***
	(6.71)	(10.61)	(6.99)	(6.85)	(10.28)	(9.76)
Observations	60	120	72	24	84	144

Note: *, **, *** denotes the statistical significance at 5%, 1% and 0.1%, respectively, the t statistic is between parenthesis

to survive.

It can be observed that with the incorporation of the control variables that the unemployment rate has a positive and significant effect on inequality. However, this loses significance when the other control variables are added, as presented in Table 3. This result differs from that proposed by García and Cruz (2017), who suggest that unemployment rates in Latin America were low in the 1990s as a result of a series of work flexibilization pollicies, reinforced by a significant increase in capital accumulation. In Colombia in 1990,Kugler and Adriana (2004) propose that by reducing dismissal costs (opposite measure to the one analyzed), it produces an increase in worker mobility, managing to reduce unemployment levels and increase the participation of companies.

Table 4 shows that the effect of the unemployment rate is not significant in the Coast region. Likewise, from the perspective of income levels, the unemployment rate has

Table 5: Effects of the policy on the Gini coefficient over time

	Global	Coast	Andes	Amazon
Policy 2009	-0.0139*	-0.0109	-0.0160	0.00780
	(-2.09)	(-0.82)	(-1.94)	(0.48)
Policy 2010	-0.0327***	-0.0253	-0.0309**	-0.0282
	(-4.29)	(-1.69)	(-3.17)	(-1.58)
Policy 2011	-0.0302***	-0.0482**	-0.0235*	-0.0154
	(-3.80)	(-3.12)	(-2.27)	(-0.84)
Policy 2012	-0.0425***	-0.0612***	-0.0347**	-0.0219
	(-5.28)	(-3.92)	(-3.28)	(-1.18)
Policy 2013	0.0530***	-0.0710***	-0.0454***	-0.0571**
	(-6.54)	(-4.51)	(-4.23)	(-3.08)
Policy 2014	-0.0466***	-0.0437**	-0.0490***	-0.0297
	(-5.73)	(-2.76)	(-4.53)	(-1.60)
Policy 2015	-0.0311***	-0.0271	-0.0412***	-0.00713
	(-3.83)	(-1.71)	(-3.79)	(-0.39)
Policy 2016	-0.0278***	-0.0260	-0.0319**	0.00489
	(-3.42)	(-1.63)	(-2.93)	(0.27)
Policy 2017	-0.0337***	-0.0381*	-0.0369***	-0.0134
	(-4.13)	(-2.38)	(-3.38)	(-0.72)
Policy 2018	-0.0495***	-0.0385*	-0.0512***	-0.0566**
	(-6.07)	(-2.42)	(-4.69)	(-3.06)
Observations	252	60	120	72

Note: *, **, *** denotes the statistical significance at 5%, 1% and 0.1%, respectively, the t statistic is between parenthesis

no effect in the MHIP. This is related to the employment absorption capacity of these provinces, where the worker mobility rate is low, and therefore, the inequality levels are low (see Fig. 2). This result supports what was proposed by Miozzo and Grimshaw (2008), where an increase in the participation of companies would not improve household income, giving an opposite response to that expected, indirectly affecting their living standards.Table 3 shows the positive and significant effect of the logarithm of informality on inequality. The precarious employment when the WFP is in effect causes workers to lose advantages and results in their preferring to work voluntarily in the informal sector. This result concurs with those of Iglesias (2014), Ruesga et al. (2014), and Albornoz et al. (2011). At the same time, there was a negative effect on MHIP, which could be

related to the degree of informality that develops and its dependence on this activity (see Table 4).

Once the effects on inequality in the analyzed period have been identified, we assessed the effects of eliminating WFP in each year that the policy was in effect. A binary variable was included for every year since the policy was introduced (2009 – 2018). This specification allows for quantifying the effect of policy for every year at the provincial and regional levels.

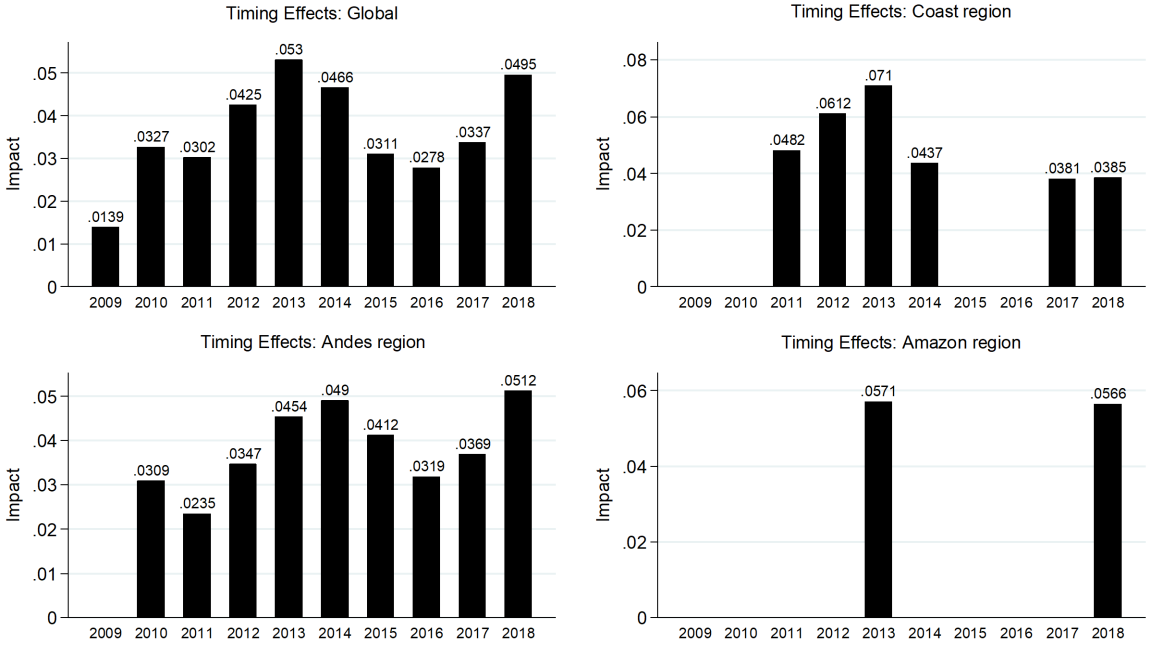

Figure 3: Effects of the policy by year in the three regions
Source: The authors based on data from ENEMDU (2019) and BCE (2019)

The results in Table 5 show a delay in the effectiveness of the policy. Taking into account the coefficients, there is a common pattern that indicates that from the third year after the implementation of the measure, the reduction in inequality levels is greater, leaving aside the years 2015 and 2016, where there was a period of crisis, generated by a drop in the price of a barrel of oil, the country's main source of income up to the present study. When classifying the provinces according to their region, the effect seems not to be the same in some groups, highlighting the Sierra region, where the greatest impacts of the policy aimed at reducing inequality are observed.

In contrast, the effect in the Coast and Amazon regions were respectively low and almost null, which may be related to the economic activities in these regions. However, substantial long-term effects of at least eight or nine years are normally confirmed. Figure 4 shows the effects on in equality (consider that they are negative effects). These differences present in Table 5 seem to follow what is proposed by Ramoni Perazzi and

Orlandoni Merli (2017) that when considering the different types of hiring, they generate a different effect on the labor market. In the context of Ecuador, the elimination of the WFP has generated a different effect in each region, which could be associated with the characteristics of each region.

5 Conclusions

The reduction of inequality is one of main challenges Ecuadorian authorities have faced for many years. Their efforts have generally translated into the construction of stricter policies on redistribution at the national level. The elimination of the WFP in 2008, which includes eliminating precarious labor conditions, results in a before and after situation in the labor market, since it provided workers with a series of advantages in their labor activities and income levels. Consequently, the evaluation of these types of policies provides very important information on the effects that work flexibility policies have on the labor market. In addition, it serves as an instrument for neighboring countries in the region to make the right decisions on economic policies aimed at the labor market.

Consequently, assessing its results is of it is important to the results to provide information for countries that have not yet introduced this type of measure to understand its potential effects.

The present study shows that eliminating the WFP was an effective measure, although it is not enough to leave conclusion in so general a manner. As has been shown, the policy has been not statistically effective in all Ecuadoran provinces if other characteristics are considered. In fact, the effectiveness of the policy losses significance according to the territory and economic level. Consequently, this study can provide some orientation to those responsible for developing policies by showing that some regions and groups are more likely to be positively affected by this and other measures designed to reduce income inequality. The results show that globally (0.033 points) and by Coast, Andes and Amazon regions (0.023, 0.014 and 0.026 points, respectively), the policy has succeeded in reducing the Gini coefficient in Ecuador between 2007 and 2018. As well, the most positive and significant effects of eliminating WFP were in HIP and MHIP. In contrast, the policy has not had significant effects in MLIP. These results are generally consistent with the second section of the literature, which confirms that levels of inequality are reduced with the reduction or elimination of WFP. In this sense, the inequality of the Sierra and HIP regions seem more prone to receive the benefits of the policy.

The effects of the policy are generally not evident in the short-term, even when they are significant in the long-term. Policies aimed at reducing inequality should focus on improving workers' bargaining power and creating an environment that favors increasing the level of formality. In addition to providing advantages to workers, these policies should take into account the characteristics of the labor market to which these markets are aimed, to reduce the adverse effects or even make no positive modifications. Future research should incorporate age ranges and fields of economic activity to identify high-risk groups and to develop measures that are sustainable over time.

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