The contribution of minimum wage valorization policy to the decline in household income inequality in Brazil: a decomposition approach

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ABSTRACT

There is a vast literature that estimates the effect of the minimum wage on wage inequality in various countries. However, as the minimum wage directly affects non-labor income of families in some countries (in the Brazilian case via the benefits of the pension system and of certain social programs), this paper extends the empirical analysis by studying the effects of the minimum wage on the level of inequality of household income as a whole. To accomplish that we employ a decomposition method that gauges the contribution of the increases in the minimum wage that occurred in the last decades in Brazil through the labor and non-labor sources of household income. The results show that the minimum wage had a contribution of 64% to the observed fall in income inequality between 1995 and 2014 and that pensions were the most relevant channel over this period.

Keywords: minimum wage; inequality; labor and non-labor income; pensions; decomposition

RESUMO

Existe uma vasta literatura que estima o efeito do salário mínimo sobre a desigualdade de salários de vários países. No entanto, como o salário mínimo afeta diretamente os rendimentos não oriundos do trabalho em alguns países (no caso brasileiro via os benefícios de aposentadorias, pensões e de certos programas sociais), este artigo amplia a abrangência da análise estudando efeitos do mínimo sobre a desigualdade de renda domiciliar como um todo. Para tanto, aplicamos uma metodologia de decomposição que permite medir a contribuição da valorização no salário mínimo ocorrida nas últimas décadas no Brasil através das fontes de renda do trabalho e não-trabalho. Os resultados mostram que a valorização do mínimo teve uma contribuição substancial, 64%, para a queda de desigualdade observada entre 1995 e 2014, com as aposentadorias e pensões apresentando-se como o canal mais importante.

Palavras-chave: salário mínimo; desigualdade; renda do trabalho e não-trabalho; aposentadorias; decomposição

JEL: D31, D63, E24, E64, H53, H55, J31

Área 12 - Economia Social e Demografia Econômica

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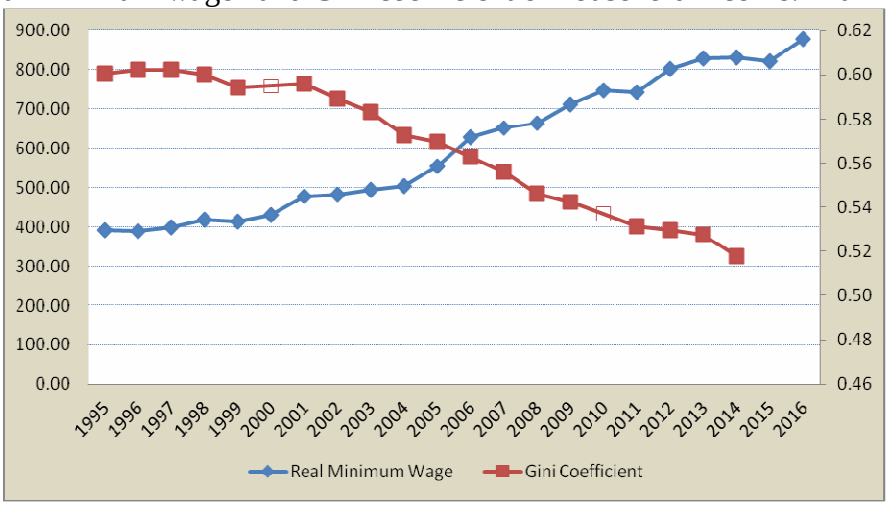
1. Introduction

A breakthrough in the country's history, household income inequality has been declining in Brazil since the mid-1990s, with greater intensity from 2002. Overall, the Gini coefficient shrank more than 14 percent from 1995 to 2014– no small feat, considering for comparison the pace of redistribution in developed countries in the post-war era (Soares 2010).

The literature has identified a number of intervenient factors, including expansion of education, labor market earnings and governmental transfers (Barros et al. 2007; Soares et al. 2007; Hoffmann e Ney 2008; Soares 2011; Azevedo et al. 2013b; Lustig et al. 2014). Recently, increasing attention has been devoted to the influence of the minimum wage in this process. Some facts underscore the new interest.

Over the 1995-2014 period, the minimum wage has more than doubled in real terms following a policy of recuperation of its past value, originally anchored in the living wage. In addition, along the last decade this valorization has been accompanied by increasing employment rates and formalization of employment relations. Hence, more workers were receiving the statutory minimum wage. As the earnings floor rose, the influence of the policy on the distribution seems direct. The symmetrical evolution of the minimum wage and the Gini coefficient of household incomes can be seen in Figure 1 below.

Figure 1: Real minimum wage* and Gini coefficient of household income: Brazil (1995-2016)



*R$ of January 2016.
Note: The minimum wage plotted here is the September value of, for each year except 2016. For this year, we plotted the January value. The PNAD data was used to calculate the Gini index, except for the Census years of 1990 and 2010. For these years, geometric averages were calculated between the Gini indices of the preceding and subsequent years.
Source: IPEADATA.

As a result of the mounting interest in the topic, a near consensus has been reached concerning the key role of the minimum wage valorization in the decline of wage inequality, and therefore also in the decline in household income inequality as labor earnings are the main component of family income. However, the studies, in general, do not take into account the fact that the minimum wage is also the official floor of public pensions and other social benefits included in the Social Security chapter of the 1988 Brazilian Constitution– and thus that it affects non-labor income as well. As a consequence, the distributive influence of the Social Security channel has been largely neglected. And yet, the effect of minimum-wage pensions seems all but relevant, if anything, in view of its share in the bulk of the country's public pensions: more than 60 percent of the benefits are pegged to the minimum wage.[1]

Moved by what we perceive as an important blind spot, in this article, we set out to estimate the overall impact of the minimum wage on the decline of income inequality in Brazil over the last two decades. We do this by identifying both the labor market effects and those related to the basic pensions and other constitutionally-defined social benefits. We use a simulation technique that allows us to gauge

[1] See Anuário Estatístico da Previdência Social, 2013.

effects on household income inequality of changes in the proportion of minimum wage earners and their position in the distribution of household income, as well as in the minimum wage value. Our results confirm the sizable distributive influence of the minimum wage in Brazil: from 1995 to 2014, the minimum wage valorization policy accounts for around 64 percent of the reduction of income inequality. While an important part derives from the compression of the labor earnings dispersion, the larger one is due to the influence of non-labor income, especially basic pensions.

In section 2, we briefly review the related theoretical and empirical literature, with emphasis on the relationship between the minimum wage and the employment level and the minimum wage's distributive effects. We describe the methodology in section 3, present the data, descriptive statistics, and results in sections 4, 5 and 6, respectively, and in section 7 we conclude by summarizing the main results and implications.

2. Minimum wage and income distribution: a brief literature overview

Standard price theory accounts for the distributive impact of (the introduction of or increases in) the minimum wage only indirectly, i.e., through the latter's expected impact on employment. It is via adjustments in employment that the minimum wage affects the income distribution, as employers respond to its imposition or rise generally by either eliminating low wage jobs (Cahuc e Zylberberg 2004) or not registering their employees (Mincer, 1976). The unintended outcome is income concentration. The issue has a long and controversial history -- which we can only provide a glimpse of here.

Back in the 1930's through to the 1950's, the dominant school in labor economics, the institutionalist school, upheld the view that the competitive model of standard price theory was not a good approximation of the way labor markets operate. The sheer presence of power asymmetries in these markets, which might result in low labor standards including earnings below the living wage, called for regulation (see Kaufman 2010). In time, the dominance in the labor economics field shifted to the Chicago school (Stigler 1946), which extended to the labor market the theoretical rationale of the market for commodities. The main implication was the prediction that attempts to raise the wage floor over the equilibrium wage would end up diminishing employment and increasing unemployment of low wage workers, frustrating the good intentions of reformers. Mincer (1976) would later add that a whole "uncovered" (informal) sector might turn up as a consequence.

The ensuing debate remained mainly theoretical, with limited empirical evidence being adduced to support the claims of either side concerning the adequacy or otherwise of a minimum wage provision, up until the beginning of the 1990's when the minimum wage empirical research underwent an upsurge. Stimulated by a series of rises in the US federal minimum wage following a decade of steep devaluation, the debate regained momentum with theoretical and methodological innovation (Belman and Wolfson 2014).

The most influential work of the initial period of (what became known as) the "New Minimum Wage Research" (Belman and Wolfson 2014; Schmitt 2013) was co-authored by David Card and Allan Krueger. Their 1994 paper on the American fast food industry, a leading employer of low wage workers, disclosed evidence of increases in employment associated with a rise in the minimum wage. Rationalizing the evidence, Card and Krueger proposed new economic thinking: entrepreneurs' willingness to take on more workers following a wage increase is all but a rational move in the logical setting of the "dynamic monopsonistic model". In this model, employers face choices that are absent in the competitive setting. Rather than the only solution of employment reduction following a wage rise, another option, the reduction of costs of turnover (of low wage employees), appears as an attractive and viable adjustment strategy to be considered (Card & Krueger 1994, 1995).

Also, among other congenial theoretical developments are job search theories (McCall 1970; Mortensen 1970) and efficiency wage models (Rebitzer 1995; Manning 1995), in addition to economic sociological approaches that draw on social norms of cooperation and fairness in industrial relations (Akerlof & Yellen 1990), and new transaction costs institutionalism (Kaufman 2010). Along with the monopsony hypothesis, all of these contributions mainly provide rationale for the minimum wage on redistributive-efficiency grounds: while employers would be stimulated to tinker with other cost saving

adjustments, workers would respond to higher wages by deploying greater attachment to their jobs and productivity.

The "monopsony turn", in particular, stimulated the production of myriad (mostly) confirmatory estimates, part of which was summarized in Card & Krueger's 1995 book. But in time it also sparked empirical controversy, subsequent to criticism of the authors' database, implying that the empirical issue was far from settled (Neumark & Wascher 2000; Card & Krueger 2000; Neumark & Wascher 2007). In fact, while later studies still found statistically insignificant and economically meager impacts of the minimum wage on employment (Dube et al. 2010, Alegretto et al 2011, Hirsch et al. 2011), others (Sabia et al 2012, Neumark et al 2013) uncovered significantly negative ones.

It is fair to say that the empirical literature not only proliferated but also grew increasingly complex. Studies diverged on results, but also varied in research designs, techniques, representativeness, levels of significance, and so forth, making it difficult to round up and get a prima facie assessment. But, then, in the 2000s, there appeared a new wave of studies devoted to meta-analysis (Schmitt 2013). Some are qualitative reviews (Neumark and Wascher 2007; Neumark and Wascher 2008; Schmitt 2013), while others are econometric exercises that, by introducing controls for degrees of statistical significance, representativeness of the settings, authorship and publication biases, and so forth, arrive at their own elasticity estimates -- the meta-regressions group of papers (Doucouliagos and Stanley 2009; Belman and Wolfson 2014). Most of this literature confirms the insignificant or negligible impact of the minimum wage on employment.

To date, the most extensive study is the one by Belman and Wolfson (2014): they reviewed over 200 scholarly and policy papers written mostly since 1991 and with evidence not limited to the US, but including estimates for the UK, New Zealand, Canada, Australia and other western countries, and concluded that "moderate increases in the minimum wage" are good for low wages and have "little or no effect on employment and hours". The overall elasticity they encountered was somewhat around the interval that had for some time been considered the approximate consensus in the field (-0.03 to -0.01), ranging from - 0.048 to - 0.018, but closer to the right end, implying that a 10% increase in the minimum wage would diminish employment by at most 0,5%.

Complementing the data for developed countries, Boeri (2015) also found increases in the minimum wage to have little or no effect on employment in emerging economies and the evidence to be inconclusive regarding informality.

Consensus seems to be even stronger when it comes to the direct empirical assessment of the effects of the minimum wage on earnings distribution. In the last decades, the impetus for this research came from the rise in inequality in developed countries and the subsequent investigation of possible determinants, among them the minimum wage. In fact, while some controversy broke out on the preeminence of the minimum wage to explain the evolution of inequality in particular countries, most national cases that were investigated testified to the distributive effects thereof.

Among the developed economies, the published debate centered on the American, French, and, more recently, British experiences, since these countries enacted statutory minimum wages while other developed ones, mostly in Europe, instead opted for collective agreements to set up the wage floor. However, Germany recently (in 2015) established a national minimum, following labor market dualization and declining coverage of collective agreements. Similarly, as a way to counteract in-work poverty in the wake of the Great Recession, a growing number of countries are introducing minimum wages: in the OECD area, 26 out of 34 countries now have a form of statutory minimum wage, while only 17 out of 30 had it back in 1998 (OECD 2015).

In the literature on the American experience, though there remains important divergence around the specific weight of the (progressive devaluation of the) minimum wage relative to the skill biased technical change or executive compensation alternative hypotheses to explain the hike in wage inequality over the last three decades, a near consensus has been achieved on its impact on the lower end of the wage distribution (DiNardo, Fortin e Lemieux 1996; Card e Krueger 1995; Lee 1999; Autor, Katz e Kearney 2008; Slonimczyk e Skott 2012). Among the European countries, studies on the French case also report important distributive effects of the minimum wage in periods of valorization, which have been consistent with relatively low unemployment levels (Fitoussi 1994; Piketty 2014). Also, a number of

studies on the United Kingdom's late experience of enacting a minimum wage (1999) have documented its de-concentration impact on the wage scale (Arrowsmith et al. 2003; Metcalf 2004; Manning 2012; Butcher et al. 2012; Dolton et al. 2010).

Studies on Latin American countries seem to reinforce the negative relationship encountered for the advanced economies between minimum wages and wage inequality. There is in fact evidence that minimum wage increases were connected with declining inequality in Colombia, between 1984 and 1990 (Bell 1997) and between 1997 and 1999 (Maloney & Mendez 2004), and in Argentina, over the first decade of the twenty-first century (Gasparini & Cruces 2010). Symmetrically, minimum wage devaluation was associated with increasing inequality in Uruguay during the 1980s and 1990s (Borraz e González 2009), and in Mexico during the 1990s (Bosch and Manacorda 2010). However, the latter result was challenged by both Bell (1997) and Campos et al. (2012), who reckoned that in Mexico the minimum wage had deteriorated so strongly by the 1980s that it stopped being a reference in the labor market and an influence on the wage distribution.

For Brazil, a number of studies have concentrated on this issue, covering the last three decades of the evolution of inequality in the country. And although most of them utilize a method of decomposition whose estimates largely depend on the order in which the explanatory variables are introduced in the model (path-dependent decompositions), thus providing a rather wide interval ranging from minimum to maximum effects (DiNardo, Fortin and Lemieux 1996), the bulk of evidence has confirmed the negative relationship between the minimum wage and wage inequality, in keeping with international results.

Thus, Menezes-Filho and Rodrigues (2009) document an increase in wage dispersion, of which at least 17% (and at most 73%) was due to minimum wage devaluation in the 1981-1999 period, whereas Neder and Ribeiro (2010) estimate a decrease in wage dispersion in the following 2002-2008 period due to minimum wage valorization, ranging from 28.7% to 67.6%, for men, and 49.4% and 69.2%, for women. Menezes-Filho and Rodrigues also found a more important effect among women, which may be explained by their being overrepresented among minimum wage workers. A similar decomposition was undertaken by Komatsu (2013) for the more recent 2004-2011 period and also arrived at an important distributive impact, of at most 68.6% for men and 92.1% for women. For the intermediary 2001-2005 period, Firpo and Reis (2007) compared the observed measures of Gini and Theil (T and L) indices with counterfactual ones, i.e., without the increase in the minimum wage. They concluded that 36.1 % of the contraction in inequality as measured by the Gini index; 29.9%, as measured by the Theil T; and 60.1%, by the Theil L were due to the valorization of the minimum wage. Since the Theil L index is more sensitive to the lower tail of wage distribution, it was able to capture the substantial weight of the minimum wage in the income of poorer workers in Brazil.

To the best of our knowledge, the single paper to document a positive relationship between the minimum wage and wage inequality, over the 1995-2012 period, is the Ferreira et al. (2014) paper, but the study also found a distributive effect in the final sub-period (2004-2012) in which the valorization was more intense. According to their estimates, this, in contrast to the previous period, was due to the reduction of the proportion of workers with earnings below the minimum wage. That paper, like the previously mentioned one, uses a path-*independent* decomposition method.

In spite of a relative proliferation of studies estimating the impact of the minimum wage on wage distribution, and the near consensus on the negative relationship, the investigation of its effect on household income distribution as a whole is scarce. This lacuna may make some sense in national settings where the minimum wage is mainly, or, perhaps, exclusively, a reference for the labor market, but this is not the case of Brazil (and also of some other Latin American countries, like Mexico and Colombia) where it also indexes governmental benefits, like the basic pension and legally guaranteed social assistance. As far as we know, only one other study (Saboia 2007) tried to gauge these extended effects. This was done for the period 1995-2005 by replacing the 2005 minimum wage level by the one prevailing in 1995 and calculating the difference of the 2005 Gini indices before and after the simulation. The overall impact on the decline of the per capita household income inequality amounted to 64%, most of it coming from the equalizing effect of the minimum wage on the labor market. As we explain in section 4, we extend the simulation, complement it with a Shapley decomposition and expand the overall period to

comprise the years from 1995 to 2014, a period of continuous decline in the per capita household income inequality in Brazil.

3. Methodology

The decomposition we use was developed by Barros et al. (2006) and further improved by Azevedo et al. (2013a) to measure the contribution of general determinants of household per capita income to changes in its distribution. The method builds upon general determinants of household per capita income (specifically, labor and non-labor income) and then exploits the fact that changes in the income distribution – and therefore in its degree of inequality – must come from the changes in distribution of these determinants. Substituting the values of each determinant from the distribution of one period into the distribution of another period, the decomposition isolates the marginal contribution of the determinant to the total change in income inequality. In the sequel, we adapt this decomposition framework to gauge the contribution of the minimum wage to changes in income inequality. To the best of our knowledge, this is the first study that applies this framework for that purpose.

3.1 – Determinants of household per capita income and the minimum wage

Household per capita income, y_{pc}, can be expressed as:

(1) $$y_{pc} = \frac{Y_h}{n} = \frac{\sum_{i=1}^{n} y_i}{n},$$

where Y_h is total household income which is composed by the sum of all sources of income, y_i, of the $i = 1, \ldots, n$ members of the household. It is convenient to disaggregate y_i in two major components: labor income, y_i^L, and non-labor income, y_i^{NL}, where the latter is composed of pensions, public transfers from social programs, and other income sources such as remittances, dividends, interest, and rents. Equation (1) then becomes:

(2) $$y_{pc} = \frac{\sum_{i=1}^{n} [y_i^L + y_i^{NL}]}{n} = \frac{\sum_{i=1}^{n} y_i^L}{n} + \frac{\sum_{i=1}^{n} y_i^{NL}}{n} = y_{pc}^L + y_{pc}^{NL},$$

with y_{pc}^L and y_{pc}^{NL} denoting household per capita income from labor and non-labor income respectively. As the minimum wage directly affects both types of income in Brazil, we gauge its contribution to changes in income inequality separately through these two sources of income.

To measure the contribution of the minimum wage to household labor income one needs to establish the set of employed household members whose wages are affected by the minimum wage. Workers that receive exactly the minimum wage as well as those whose wages are sufficiently close or linked to the minimum wage (e.g., those that earn multiples of the minimum) are the main candidates to compose this set of minimum wage (labor) earners.[2] In this study, we only focus on those workers earning exactly the value of minimum wage and abstract from potential spillover effects of the minimum wage on the wages of other household members. The main reason for restricting the set to minimum wage earners is that it is difficult to determine if and to what extent the wages of other workers in the household are affected by the minimum wage. Indeed, one would need to make a set of hypothesis about how changes in the minimum wage influence the wages of all workers that earn either below or above the value of the minimum wage. Focusing on minimum wage earners has the advantage of being a clear-cut approach. Nevertheless, one should bear in mind that this approach only captures a partial contribution of the minimum wage to inequality via labor earnings.

Restricting attention to workers that receive exactly the minimum wage allows us to frame the impact of the minimum on household labor income in a simple way. Let $D_i^L = \mathbf{1}\{y_i^L = mw\}$, where mw is the value of the minimum wage and $\mathbf{1}\{.\}$ an indicator function that assumes unit value if the labor earnings of individual i is equal to the minimum wage and zero otherwise. Denoting any labor income that is different from the minimum wage by $\tilde{y}_i^L$:

(3) $$y_{pc}^L = \frac{\sum_{i=1}^{n} y_i^L}{n} = \frac{\sum_{i=1}^{n} D_i^L mw + (1 - D_i^L)\tilde{y}_i^L}{n} = p_h^{L,mw} mw + \tilde{y}_{pc}^L,$$

[2] Though the 1988 Constitution precludes the use of the minimum wage as an index for other wages, this type of informal arrangement is often times used in the labor market.

where $p_h^{L,mw} = n^{-1}\sum_{i=1}^{n} D_i^L$ is the proportion of household members that earn the minimum wage in the labor market and $\tilde{y}_{pc}^L$ is household per capita labor income not directly linked to the minimum wage.

As already mentioned, in Brazil, the minimum wage is the reference value for some sources of non-labor income, most notably as the floor of the benefits paid in the pension system and the value of the benefit paid by the BPC program.[3] Hence, similarly to what was done for labor income, we can now define $D_i^{NL} = 1\{y_i^{NL} = mw\}$, where D_i^{NL} assumes unit value if the non-labor income of individual i is equal to the minimum wage and zero otherwise. Denoting by $\tilde{y}_i^{NL}$ any non-labor income that is different from the minimum wage, we write:

(4) $$y_{pc}^{NL} = \frac{\sum_{i=1}^{n} y_i^{NL}}{n} = \frac{\sum_{i=1}^{n} D_i^{NL} mw + (1 - D_i^{NL})\tilde{y}_i^{NL}}{n} = p_h^{NL,mw} mw + \tilde{y}_{pc}^{NL},$$

where $p_h^{NL,mw} = n^{-1}\sum_{i=1}^{n} D_i^{NL}$ is the proportion of household members receiving the minimum wage as non-labor income and $\tilde{y}_{pc}^{NL}$ is household per capita non-labor income not associated with the minimum wage. To capture the contribution of the minimum wage separately through the pensions system and the BPC program, we write $p_h^{NL,mw} = p_h^{NL,mw,PS} + p_h^{NL,mw,BPC}$, with obvious notation.

Combining expressions (2), (3), and (4) we obtain:

(5)

$$\begin{aligned} y_{pc} = y_{pc}^L + y_{pc}^{NL} &= \left[p_h^{L,mw} mw + \tilde{y}_{pc}^L\right] + \left[p_h^{NL,mw} mw + \tilde{y}_{pc}^{NL}\right] \\ &= \left[p_h^{L,mw} mw\right] + \left[p_h^{NL,mw} mw\right] + \left[\tilde{y}_{pc}^{NL} + \tilde{y}_{pc}^L\right] = \\ &= \left[p_h^{L,mw} mw\right] + \left[p_h^{NL,mw,PS} mw + p_h^{NL,mw,BPC} mw\right] + \left[\tilde{y}_{pc}\right] \\ &= g\left(p_h^{L,mw}, p_h^{NL,mw,PS}, p_h^{NL,mw,BPC}, mw, \tilde{y}_{pc}\right) \end{aligned}$$

where in the next to last line we have aggregated $\tilde{y}_{pc}^{NL}$ and $\tilde{y}_{pc}^L$ into $\tilde{y}_{pc}$, the household per capita income not linked to the minimum wage.[4] This expression shows that household per capita income is determined by the proportion of minimum wage earners in the labor market, the proportions of minimum wage beneficiaries of the pensions system and the BPC program, the value of the minimum wage itself, and the household per capita income that is not directly tied to the minimum wage.

3.2 - Decomposition of household per capita income

Let $F(y_{pc}^t)$ represent the cumulative distribution function of the household per capita income in period t and $\theta^t = \Theta\left(F(y_{pc}^t)\right)$ be any measure of inequality of this distribution (e.g., the Gini coefficient). In equation (5) we established that the per capita income of a household can be expressed as a function of the proportion of minimum wage earners in the household, the value of the minimum wage, and the per capita income not linked to the minimum wage. Hence, using (5) for time period t, we can write:

(6) $$\theta^t = \Theta\left(F(y_{pc}^t)\right) = \Theta\left(F\left(g\left(p_h^{L,mw,t}, p_h^{NL,mw,PS,t}, p_h^{NL,mw,BPC,t}, mw^t, \tilde{y}_{pc}^t\right)\right)\right).$$

We are interested in measuring the contribution of each component in $\left(p_h^{L,mw,t}, p_h^{NL,mw,PS,t}, p_h^{NL,mw,BPC,t}, mw^t, \tilde{y}_{pc}^t\right)$ to the change in the distribution of per capita income (and therefore in its degree of inequality) between any two points in time, say, $t = 0,1$. To do that we simulate counterfactual distributions of household per capita income by replacing the values of each component from period 0 with their corresponding values from period 1. As we do not have panel data, this is operationalized by ordering the households according to their per capita income in period 0 and assigning the average value of the variable of interest for each corresponding percentile from the per capita income distribution in period 1.

The counterfactual distributions are obtained in a sequential, cumulative fashion for each component up to the last one, when the distribution of period 1 is recovered. The inequality measure computed for each simulated distribution may be interpreted as the inequality that would have prevailed

[3] We ignore the eventual influence of the minimum wage on other non-labor income of households.

[4] Note that the contribution of the change in the value of minimum wage can be computed separately through the labor and non-labor (pensions and BPC) channels.

had that component assumed the values observed in period 1. Hence, subtracting the inequality measure calculated at each step in the sequence from the previous one provides a measure of the contribution of that specific component to the change in inequality from period 0 to period 1. Table 1 presents an example of this sequence.[5]

Table 1: Example of the steps of the decomposition methodology

Observed/Counterfactual Inequality	**Contribution of the:**
Initial inequality rate:	
$\theta^0 = \Theta\left(F\left(g\left(p_h^{L,mw,0}, p_h^{NL,mw,PS,0}, p_h^{NL,mw,BPC,0}, mw^0, \tilde{y}_{pc}^0\right)\right)\right)$	
$\hat{\theta}^{s1} = \Theta\left(F\left(g\left(p_h^{L,mw,1}, p_h^{NL,mw,PS,0}, p_h^{NL,mw,BPC,0}, mw^0, \tilde{y}_{pc}^0\right)\right)\right)$	Proportion of employed mw earners: $\hat{\theta}^{s1} - \theta^0$
$\hat{\theta}^{s2} = \Theta\left(F\left(g\left(p_h^{L,mw,1}, p_h^{NL,mw,PS,1}, p_h^{NL,mw,BPC,0}, mw^0, \tilde{y}_{pc}^0\right)\right)\right)$	Proportion of mw earners in the pension system: $\hat{\theta}^{s2} - \hat{\theta}^{s1}$
$\hat{\theta}^{s3} = \Theta\left(F\left(g\left(p_h^{L,mw,1}, p_h^{NL,mw,PS,1}, p_h^{NL,mw,BPC,1}, mw^0, \tilde{y}_{pc}^0\right)\right)\right)$	Proportion of mw earners in the BPC program: $\hat{\theta}^{s3} - \hat{\theta}^{s2}$
$\hat{\theta}^{s4} = \Theta\left(F\left(g\left(p_h^{L,mw,1}, p_h^{NL,mw,PS,1}, p_h^{NL,mw,BPC,1}, mw^1, \tilde{y}_{pc}^0\right)\right)\right)$	Minimum wage value: $\hat{\theta}^{s4} - \hat{\theta}^{s3}$
Final inequality rate:	
$\theta^1 = \Theta\left(F\left(g\left(p_h^{L,mw,1}, p_h^{NL,mw,PS,1}, p_h^{NL,mw,BPC,1}, mw^1, \tilde{y}_{pc}^1\right)\right)\right)$	Other non-mw (labor andnon-labor) income: $\theta^1 - \hat{\theta}^{s4}$

From this analytic framework, we can see that the level of income inequality is affected by the minimum wage through the distributions of labor and non-labor minimum wage earners and the own value of the minimum wage. It is difficult to say a priori whether income inequality will rise or fall as it depends in a complex fashion on the distributional position of minimum wage earners along the entire income distribution. The magnitude of the variation in the value of the minimum wage also matters: all else equal, the higher the increase in its value the larger the change in inequality.

It is important to point out that computing the contribution of each factor in the sequential fashion presented in Table 1 suffers from the problem of path dependence typically encountered in the decomposition literature.[6] Indeed, the contributions of the factors can be quite sensitive to the order in which they enter the sequence of steps. To tackle this problem we follow Azevedo et al. (2013a) who modified the method proposed by Barros et al. (2006), which did not address this issue.[7] Specifically, they applied the Shapley (1953) and Shorrocks (2013) procedure that consists in taking the average of the contributions of each factor across all possible orders in which they can enter the decomposition.[8]

[5] This is a simplified example since we do not show in the table the counterfactuals associated with changing the minimum wage value for each component (labor, pensions, and the BPC) separately.

[6] See Fortin et al. (2011) for a general review of decomposition methods in applied microeconomics.

[7] Another difference between the studies is that Barros et al. (2006) simulates the counterfactual distributions in a fashion that also incorporates the association between some subsets of two variables. Azevedo et al. (2013a) includes one variable at a time disregarding the contribution of these associations of variables. The point raised by Azevedo et al. (2013a) for sustaining their method is that isolating the contribution of the association of subsets of two specific variables is partial since the change in one variable can potentially affect all other variables. See Azevedo et al. (2013a) for a comparison of the two methods.

[8] As we have six variables, there were 6! = 720 possible paths to consider. Operationally, this was done via the Stata ado file

It is important to point out that the counterfactual distributions that are obtained through this decomposition method are not the result of an economic equilibrium. Instead, they are just a simulated exercise in which it is assumed that one factor can be changed at a time keeping all other factors constant. Despite this caveat, we believe our results provide evidence on the potential effects of the minimum wage to changes in overall income inequality.

4. DATA

4.1 Database and sample

The database used is the National Household Sample Survey (Pesquisa Nacional por Amostra de Domicílios, or PNAD) conducted by the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística, or IBGE), which has national coverage and is conducted on an annual basis. The survey obtains information on demographic and socioeconomic characteristics of the population, including but not limited to gender, age, education, work and income, using Brazilian households as the sampling units.

We used data for 1995, 2002, 2009 and 2014.[9] The primary analysis is for the entire period between 1995 and 2014, but the sub-periods marked by the administrations of three different presidents are also explored. Specifically, it was decided to examine the initial and final years of each administration: 1995-2002 (administrations of President Fernando Henrique Cardoso), 2002-2009 (administrations of President Lula) and 2011-2014 (first administration of President Dilma Rousseff).[10]

Only households with valid information on monthly household income were considered, i.e., households for which household income was ignored were excluded.[11] On average, the loss of households for lack of information on household income in the years analyzed in this study was 2.6%. The results were obtained by including households whose income was equal to zero, a situation that could be attributed to either loss of employment at the time of the survey or reporting error. All of the analyses excluded these households, and the results were qualitatively the same.[12]

To construct monthly household *per capita* income, domestic workers or relatives of a domestic worker and retirees were excluded from the household; the income of individuals aged 10 and older were considered. All of the incomes used to construct the household *per capita* income were deflated for September 2014 based on the deflator for IBGE household surveys proposed by Corseuil and Foguel (2002).

In the decomposition simulations described in section 3, we used only individuals receiving exactly one minimum wage either in the labor market or through the pension and social assistance system. Because of possible income reporting errors in the PNAD, we considered as minimum wage recipients all individuals who reported receiving between 0.95 and 1.05 of one minimum wage in the reference month of the survey (usually September of each year) as their main job income. For income originating from the pension and social assistance system, only the exact amount of the minimum wage was considered.

4.2 BPC recipients

Although the Continuous Cash Benefit (Benefício de Prestação Continuada, or BPC) was provided for in the 1988 Constitution, administrative records of its grant date back to 1996, the effective year of its implementation and the termination of the Lifelong Monthly Income benefit (Renda Mensal

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'adecomp' developed by Azevedo et al. (2012).

[9]Because the rural areas of the states of Rondônia, Acre, Amazonas, Roraima, Pará and Amapá were not included in the PNAD sample until 2004, households in those areas were excluded from the analysis. However, these households represented a small share of 2.6% of the sample, and the population of these areas accounted for only 1.9% of the population in 2014.

[10]Although the Lula administration started in 2003, it was decided to always use the final year of the previous administration as the first year of the next administration to maintain the continuity of the series. Because the second Lula administration ended in 2010, a demographic census year in which the PNAD is not conducted, we used the PNAD 2009 for its closing year. The Cardoso administrations also lose a year with the absence of the PNAD in 1994. Thus, we kept 7 years for the Cardoso administrations, seven years for the Lula administrations and 5 years for the Dilma administration.

[11]This occurs when at least one source of income of any household resident either is not reported or does not comply with the IBGE's data review and is therefore ignored to avoid affecting the income level.

[12]These results are available from the authors upon request.

Vitalícia) (Kerstenetzky, 2012). According to the Brazilian Ministry of Social Development and Fight against Hunger (Ministério de Desenvolvimento Social e Combate à Fome, or MDS),[13] in December 1996, 346,000 benefits were granted, a number that increased to 1.6 million in 2002, 3.1 million in 2009, and approximately 4 million in 2014.[14]

However, the PNAD's collection of data on this benefit is complicated either because of reporting errors from informants, who confuse the benefit with the retirement or pension, or collection bias, i.e., collection problems at the locations selected by the survey. Souza (2013) identifies three possible reasons for collection bias by the PNAD in the case of social programs: 1) individuals of interest are either geographically concentrated or difficult to sample; 2) individuals of interest are sampled but (purposefully or not) do not report participating in certain programs (or the reverse); and 3) there is an absence of variables that identify the beneficiary in the main body of the survey.

With respect to the third point, the PNAD does not have a specific question that identifies receipt of the BPC; this income is included under the "Other income" variable, which also considers income from social programs, savings account interest and other financial investments, and dividends, among other sources. Some studies (e.g., Foguel and Barros, 2010) identify social programs through the method of the typical values of program benefits. For example, when an individual reports receiving one minimum wage as other income, it is assumed that it is BPC income.

Table 4.1 shows the number of individuals receiving BPC each year, analyzed based on PNAD and administrative records' estimates. By using the method of typical values and considering the households in our sample, the identification of BPC in the PNAD in relation to administrative records only exceeded 50% in 2014. Whereas the PNAD identified 2.4 million beneficiaries in 2014, the administrative records indicated that 4 million benefits were granted in September of that year. However, although the BPC is underestimated in the survey, the PNAD can reasonably reflect the regional distribution of administrative data (Soares et al., 2007). Even so, the results presented, which take into account the minimum wage as the BPC value, should be interpreted with caution.

Table 4.1: BPC beneficiaries in the PNAD and administrative records

Individuals benefitting from BPC-Loas	1995*	2002	2009	2014
Typical PNAD values (a)	129,663	373,849	1,513,484	2,363,359
Administrative records (b)	346,219	1,560,854	3,084,783	4,085,163
Ratio between (a) and (b)	0.37	0.24	0.49	0.58

*Administrative record for 1996, PNAD data for 1995.

Source: PNAD/IBGE and MDS.

5. Descriptive Statistics

Table 5.1 provides an overview of changes in the minimum wage, inequality and average income in the period under analysis. The real minimum wage increased over the period and had an accumulated variation between 1995 and 2014 of 112.8%, which corresponds to an annual growth rate of 4.1%. The period of greatest increase was from 2002 to 2009, with an annual growth of 5.8%, followed by the two remaining sub-periods, each presenting growth of approximately 3% per year. The Gini coefficient dropped 14.5% between 1995 and 2014, equivalent to a drop of 0.8% per year. This reduction was more pronounced in the period of highest increase in the real minimum wage (2002-2009), corresponding to an annualized drop of 1.2% (8.4% in total). In the subsequent sub-period of 2009 to 2014, the Gini index dropped 0.9% in annual terms (4.4% in total). In the sub-period from 1995 to 2002, the decrease in this indicator was much smaller, corresponding to 0.3% annually (2.4% in total). Calculating the elasticity (in

[13]Available at: http://www.mds.gov.br/relcrys/bpc/1_tab_evolucao_concessao.htm and http://www.mds.gov.br/relcrys/bpc/download_beneficiarios_bpc.htm.

[14]According to Kerstenetzky (2012), in 2003, the elderly statute reduced the age of eligibility for the BPC from 67 to 65, and in 2007, there was a relaxation of the concept of disability. Both measures have contributed to increase the welfare benefits' target audience.

annual terms) of the relative variations of the Gini index and the real minimum wage, an increase of 10% in the real value of the minimum wage corresponded to a decrease of 11% in the Gini index between 1995 and 2002, 22% between 2002 and 2009, 29% between 2009 and 2014, and 20% between 1995 and 2014.

Table 5.1 also shows that the average household *per capita* income also increased in the period as a whole, with an annual growth rate of 1.9%. This growth, however, was not homogeneous between sub-periods, with a drop of 0.3% annually in the first sub-period from 1995 to 2002 and an annual positive growth of 2.8% and 3.8% for 2002-2009 and 2009-2014, respectively. Movements in *per capita* income and the minimum wage led to a decrease in the ratio between these variables until 2009, showing that minimum wage increases were also substantial in relative terms. In 2014, this ratio remained almost the same as in 2009.

Table 5.1: Minimum wage value and indicators of household *per capita* income distribution (hpci)

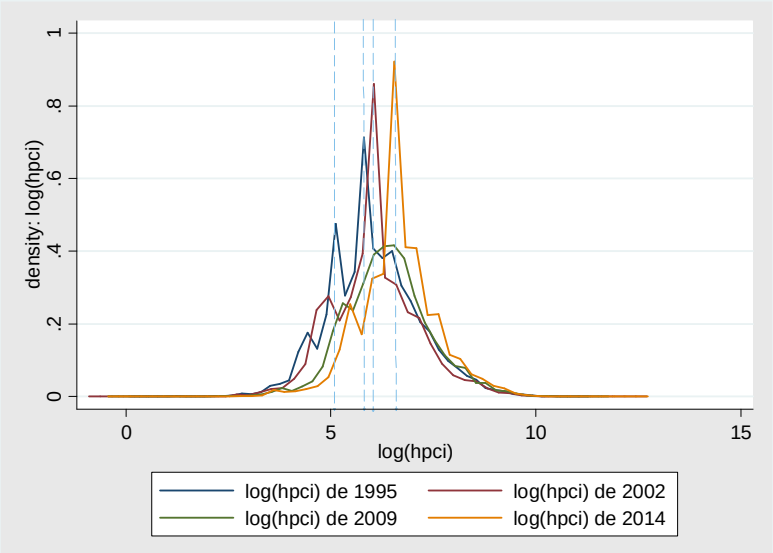
Indicators	1995	2002	2009	2014
Gini index of hpci	0.6084	0.5939	0.5439	0.5199
Real valor of MW - in R$	340.17	418.95	621.62	724.00
Average hpci - in R$	870.32	853.70	1033.06	1247.29
Average hpci - in SM	2.6	2.0	1.7	1.7

Period	Annual variation of the average hpci (%)	Annual variation of the real value of MW (%)	Annual variation of the Gini hpci (%)	Gini Elasticity-MW
2002-1995	-0.3	3.0	-0.3	-0.11
2009-2002	2.8	5.8	-1.2	-0.22
2014-2009	3.8	3.1	-0.9	-0.29
2014-1995	1.9	4.1	-0.8	-0.20

Source: Constructed by the authors based on microdata from PNAD 1995-2014.
Notes: The values were deflated in 2014 based on Corseuil and Foguel (2002); includes households with zero income.

Figure 5.1 presents the kernel density estimate for the logarithm of real household *per capita* income between 1995 and 2014. The vertical dashed lines represent the logarithm of the minimum wage in each year included in the graph. The figure shows that the household *per capita* income distribution moved to the right and became less dispersed, which is consistent with the increase in average income and the reduction in inequality shown in Table 5.1. Additionally, there is a discontinuity in the distributions of the minimum wage values each year, which shows that the minimum wage is an important value in these distributions.

Figure 5.1: Kernel density of real household *per capita* income distribution



Source: Constructed by the authors based on microdata from PNAD 1995-2014.
Notes: The vertical lines correspond to the value of the logarithm of the minimum wage for each year.

Table 5.2 shows the importance of the minimum wage for households and individuals through the three main channels through which it directly affects income inequality: income from employment, retirement or pensions, and welfare benefits (BPC). The proportion of households with at least one employed individual receiving a minimum wage increased from 15.9% in 1995 to 16.7% in 2014, reaching a peak of 17.1% in 2009. During this period, the proportion of households with at least one retiree or pensioner receiving a minimum wage grew systematically from 16.4% in 1995 to 20.2% in 2014. The proportion of households with at least one BPC beneficiary was low in the early years of the analysis but increases in importance starting in 2009.

This increased importance of the minimum wage is also observed by the changes in the proportion of individuals receiving minimum wage. Through the labor market channel, a systematic increase is observed in the proportion of workers receiving the minimum wage, which increased from 4.9% in 1995 to 6.5% in 2014. Through the pension system channel, this increase was even more intense, increasing from 5.0% to 8.3% in the same period. As observed for households, the percentage of individuals receiving the BPC was small until 2009, when the BPC starts to become more important. These differences in minimum wage coverage both between the analyzed channels and over time are important because they indicate each channel's capacity to influence income inequality.

Table 5.2: Percentage of households and individuals receiving minimum wage, 1995-2014

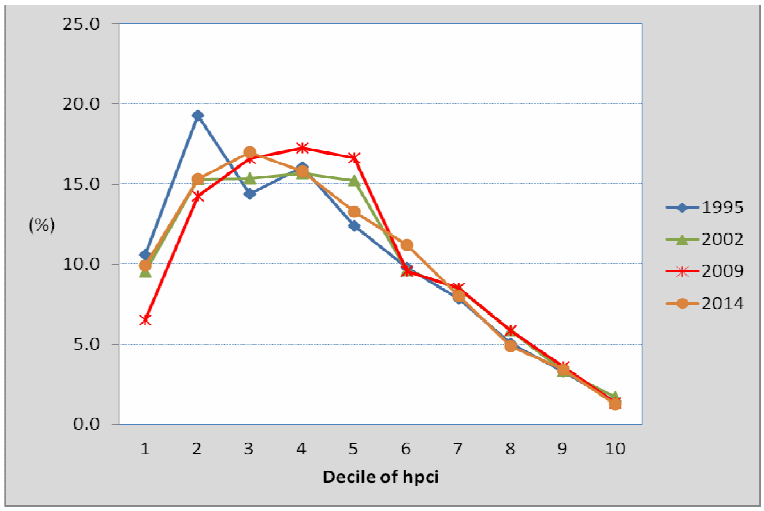
HOUSEHOLDS	1995	2002	2009	2014
Total households (%)	100.0	100.0	100.0	100.0
Households with at least 1 employed person	15.9	16.7	17.1	16.7
Households with at least one retiree or pensioner with MW	16.4	19.4	19.7	20.2
Households with at least one BPC beneficiary	0.3	0.7	2.5	3.4
INDIVIDUALS	**1995**	**2002**	**2009**	**2014**
Total individuals (%)	100.0	100.0	100.0	100.0
Employed individuals with MW	4.9	5.4	6.2	6.5
Retired individuals or pensioners with MW	5.0	6.6	7.4	8.3
BPC recipients	0.1	0.2	0.8	1.2

Source: Constructed by the authors based on microdata from PNAD 1995-2014.
Notes: Minimum wage (MW) recipient refers to a person who reports receiving between 0.95 and 1.05 of the value of the current minimum wage in the reference month of the survey in the labor market and exactly the minimum wage through the pension and social assistance systems.

The increased importance of the minimum wage as a source of household income shown in Table 5.1 will have a higher or lower direct impact on inequality depending on changes in the position of minimum wage recipients in the income distribution. Because these changes occur throughout the income distribution, it is difficult to access the sign and magnitude of their impact on the degree of inequality of this distribution without the use of a methodology (as the one used here) that can capture the impacts over the entire distribution. Still, knowing how minimum wage recipients are distributed within the income distribution gives an idea of the minimum wage's potential contribution to inequality. The next three graphs showing the distribution of minimum wage recipients in each channel considered in the analysis (labor market, pensions and BPC) between the tenths of the distribution of household *per capita* income (hpci) provide some evidence of this potential contribution of the minimum wage.

Figure 5.2 shows the distribution of workers who earn one minimum wage according to the deciles of the hpci for the years of the series. It is observed that regardless of the year, the minimum wage has a large influence on the workers located in the poorest half of the distribution. Indeed, approximately 70% of those receiving the minimum wage through the labor market are below the hpci median, indicating that the minimum wage has a high potential to reduce income inequality through this channel.

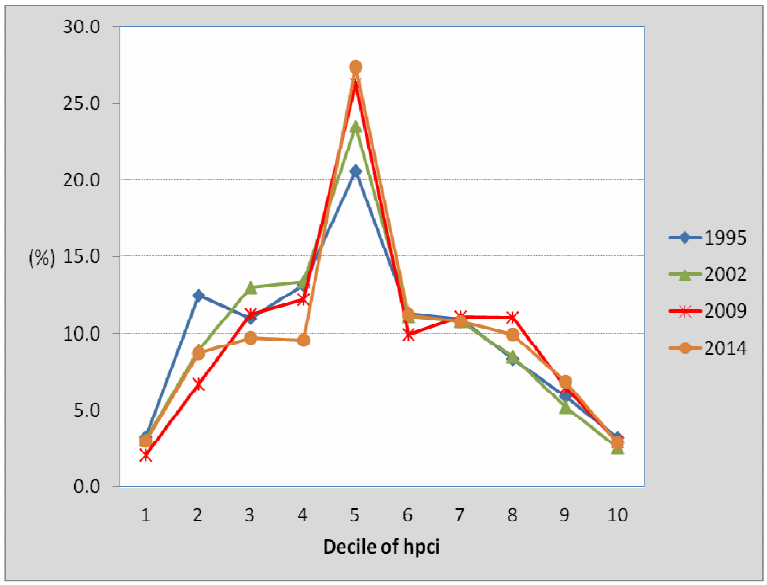
Figure 5.2: Distribution of minimum wage recipients in the labor market according to the decile of household *per capita* income in Brazil, 1995-2014.



Source: Constructed by the authors based on microdata from PNAD 1995-2014.

Figure 5.3 shows the distribution of retirees and pensioners who earn a minimum wage according to the deciles of hpci. Unlike what is observed for the labor market, the MW recipients through the pension system tend to be concentrated in the fifth decile and over the years, this concentration increased from 20% in 1995 to 27% in 2014. As in the case of the labor market, there is a high percentage of minimum wage recipients through the pension system before the median is reached (approximately 60%), again indicating a high potential of minimum wage to reduce inequality.

Figure 5.3: Distribution of minimum wage recipients in the pension system by decile of household *per capita* income in Brazil, 1995-2014



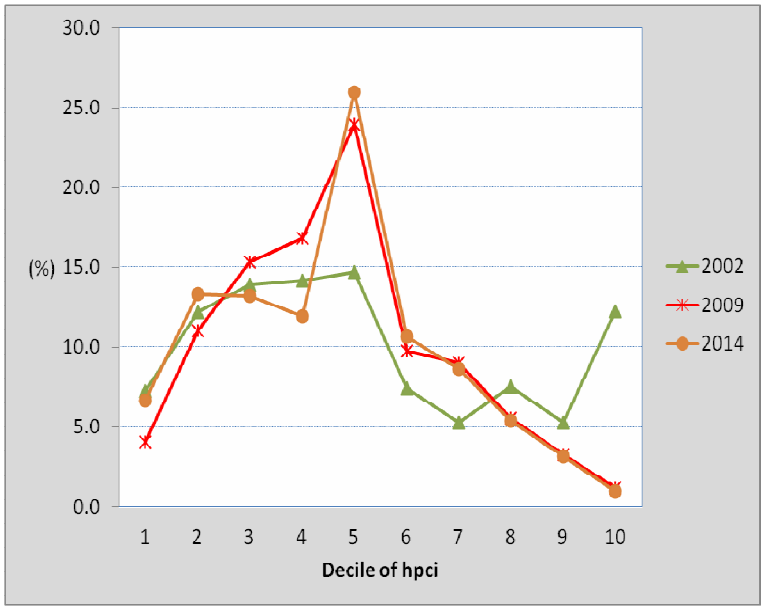
Source: Constructed by the authors based on microdata from PNAD 1995-2014.

Figure 5.4 presents the location in the hpci distribution of BPC beneficiaries whose benefit is linked to the minimum wage.[15] It is observed that minimum wage recipients through the social assistance system tend to be concentrated in the first half of the income distribution and as in the case of pension recipients, there is a concentration in the fifth decile, especially in 2009 and 2014. Although exhibiting a

[15]The line for 1995 is not plotted because of the low incidence of BPC recipients in the PNAD that year.

distributional pattern similar to that of pensions, it is expected that BPC does not have the same potential to affect inequality because its coverage is quite smaller than that of pensions (Table 5.1).

Figure 5.4: Distribution of BPC recipients by decile of household *per capita* income in Brazil, 2002-2014.



Source: Constructed by the authors based on microdata from PNAD 1995-2014.

6. Results

In this section, we present the results of the decomposition presented in section 3. The inequality indicator used to measure the contribution of the minimum wage is the Gini index.[16]

Table 6.1 presents the effect on variations in the Gini index between the pairs of years for each factor of equation (5) in section 3. Because the order in which each factor enters the simulation can generate a distinct result, we used the Shapley method, varying each factor in all possible orders and taking an average of the effects found in each simulation. Table 6.1 reports these average effects for the periods 1995-2002 (column a), 2002-2009 (column b), 2009-2014 (column c) and 1995-2014 (column d).

When we analyze the entire period (1995-2014), the reduction in the Gini index was 0.0885, representing a decrease of 14.6% in this indicator. In this period, the component Other income, which includes donations, rents, various social programs, interests and dividends, pensions above the minimum pension and labor income different from one minimum wage, accounted for 35.7% of the reduction in the Gini index. The change in the distribution of retirees and pensioners receiving the minimum wage contributed 15.5%, whereas the increase in the minimum wage value through this channel contributed 18.8%. Therefore, the pension system channel had a weight of 34.3% for the reduction of inequality in this period. Through the labor market, the contribution of the change in the distribution of workers earning one minimum wage was 9.2%, which, added to the 12.0% associated with the increase in minimum wage value, amounted to a share of 21.2%. The total effect of the BPC was 8.8%, with half attributable to the increase in the minimum wage value and the other half attributable to the change in the distribution of beneficiaries of this program. Therefore, considering all of the direct channels through which the minimum wage affected income distribution in these twenty years, the total contribution was 64.3%, emphasizing the role of linking the minimum wage to the pension system, which accounted for more than half of that contribution.

[16]We used the command *adecomp*, which has been developed by Azevedo et al. (2013) for Stata. Although this command delivers results for the Gini and Theil indexes, inequality differences calculated by the Theil index between periods do not coincide with those calculated by other procedures. Therefore, we decided to present only the results for the Gini index, whose differences were confirmed by other calculation methods.

Table 6.1: Average effect on variations in the Gini index of household *per capita* income in Brazil, 1995-2014

	1995-2002 (a)			2002-2009 (b)			2009-2014 (c)			1995-2014 (d)		
	Gini	**SD**	**% Gini**	**Gini**	**SD**	**% Gini**	**Gini**	**SD**	**% Gini**	**Gini**	**SD**	**% Gini**
Indicator Year 1	0.6084			0.5939			0.5439			0.6084		
Indicator Year 2	0.5939			0.5439			0.5199			0.5199		
Total Change	-0.0144	0.0000	100.0	-0.0500	0.0000	100.0	-0.0241	0.0000	100.0	-0.0885	0.0000	100.0
MW value at the labor market	-0.0035	0.0007	24.0	-0.0069	0.0010	13.8	-0.0013	-0.0010	5.2	-0.0106	0.0005	12.0
MW value at social security	-0.0068	0.0002	46.8	-0.0078	0.0004	15.7	-0.0032	-0.0008	13.3	-0.0167	-0.0004	18.8
BPC value	-0.0007	-0.0001	4.6	-0.0028	0.0007	5.6	-0.0006	-0.0010	2.3	-0.0039	0.0001	4.4
Others	0.0058	0.0004	-40.5	-0.0201	0.0005	40.3	-0.0146	-0.0010	60.7	-0.0316	-0.0003	35.7
Distribution of employed w/ MW	-0.0027	0.0007	18.4	-0.0049	0.0010	9.8	-0.0009	-0.0010	3.7	-0.0081	0.0005	9.2
Distribution of social sec. w/ MW	-0.0061	0.0002	42.0	-0.0046	0.0003	9.3	-0.0030	-0.0008	12.6	-0.0137	-0.0004	15.5
BPC distribution	-0.0007	-0.0001	4.6	-0.0028	0.0007	5.5	-0.0005	-0.0010	2.2	-0.0039	0.0001	4.4
Observations:	187370			219158			227331			195543		

Source: Constructed by the authors based on microdata from PNAD 1995-2014.

Notes: The contributions of each component are based on the decomposition method described in section 3. Households with zero income are included. "Others" includes income from donations, rents, social programs, interests, dividends, pensions above the minimum wage and labor income different from one minimum wage. SD columns refer to the standard deviation obtained through the Shapley method.

As shown in Table 5.1, the sub-period of greater reduction in the Gini index (-0.050 or -1.2% per year) and greater increase in the real minimum wage (5.8% per year) was between 2002 and 2009. During this period, the total contribution of the minimum wage to reduction in inequality was 59.7%, with 23.6% being through the labor market channel, 25.0% through the pension system and 11.1% through the BPC. The sub-period 2009-2014 was the one that presented the second-greatest decline in the Gini index (-0.024 or -0.9% per year), and the increase in the real minimum wage was 3.1% per year. The contribution of the minimum wage through the three channels studied here was lower than in the previous sub-period, totaling 39.3%, with the pension system being the main channel (25.9%), followed by the labor market (8.9%) and BPC (4.5%). In the sub-period 1995-2002, the Gini index experienced its smallest drop (-0.014 or -0.3% per year), and the real minimum wage increased by 3.0% in annual terms. During this period, the minimum wage contribution exceeded 100% (140.5%), with the share related to "Other income" having contributed to increasing inequality. The results for this first sub-period diverge from the results for the other two, particularly 2009-2014, when the annual growth of the real minimum wage was almost the same. Although several factors might explain these differences in results, including changes in the distribution of minimum wage recipients through the channels studied here, it is possible that a small change in the Gini index between 1995 and 2002 is responsible for much of the distortion in the contributions of the various components used in the method employed here. Nevertheless, the results of the decomposition for 1995-2002 show that as in the other two sub-periods, the pension system channel was the main distributional component, followed by the labor market and the BPC.

The results both for the period as a whole and for the sub-periods show that minimum wage played an important role in reducing inequality in income distribution. One of the virtues of the method used here is that it enables us to assess the contribution of the minimum wage through several channels by which it affects income inequality. Our results show that the contribution of the minimum wage was mainly through the pension system channel. As shown in section 5, an increasing proportion and more than half of retirees and pensioners receive the minimum wage through this channel; this group tends to be concentrated around the median of the income distribution. In the labor market, although approximately 1/5 of the workers receive a minimum wage, they tend to be concentrated at the bottom of the income distribution. Thus, although the location factor in the income distribution tends to favor the distributive effect of the minimum wage through the labor market, the high and increasing concentration of recipients of the minimum wage through the pension system seems to have played a predominant role.

Another virtue of the method used here is that it enables us to separate the contributions of the minimum wage between the components of distribution of its recipients and variation in its value. For the entire 1995-2014 period, there was a preponderance of the appreciation component of the minimum wage, contributing to 35.2% of the drop in inequality in relation to the distributional factor, which

accounted for 29.1%. Analyzing per sub-period, this pattern is true for all periods: 75.4% versus 65.0% in 1995-2002, 35.1% versus 24.6% in 2002-2009, and 20.8% versus 18.5% in 2009-2014. If the minimum wage in Brazil had not grown so substantially in the last two decades, it is likely that changes in the distribution of its recipients would be very different from those observed. The method used here does not permit us to build this type of counterfactual because it is based on changes observed in the data. The results that it shows are that the significant increase in the minimum wage played a predominant role relative to the change in the distribution of its recipients in explaining the decline in inequality during the period analyzed.

Concluding remarks

The theoretical and empirical controversies surrounding the impact of statutory minimum wages on employment seem now things of the past, as an avalanche of papers has documented non-significant or negligible impacts, in developed and developing countries alike. As for the distributive effects of the minimum wage, a vast and increasing body of literature has confirmed its de-concentration effects. In its wake, the setup of minimum wages in the developed world seems now the 'new normal', in fact, a reaction to increasing wage inequality and in-work poverty.

Likewise, in emerging economies, an empirical consensus is growing around the distributive virtues of minimum wages. The Brazilian literature adds to this, as it has been able to ascertain through different empirical methods the negative impact of the minimum wage on wage inequality. The policy of valorization of the minimum wage, in place since 1995, in combination with the decline of inequality, provides a natural experiment for the empirical investigation.

This paper innovates on two counts. First, it attempts to gauge the contribution of the minimum wage to the reduction of inequality in the distribution of household per capita income, while recognizing that in Brazil this influence exists on both labor and non-labor incomes, i.e. on wages, basic pensions and constitutionally-defined social benefits. Secondly, it uses a path-independent decomposition that enables investigation of the various channels of influence of the minimum wage on household income and separation of effects of changes in distributional positions of minimum wage receivers from effects of sheer valorization of it.

The descriptive statistics already suggested these effects to be sizable: they showed the proportion of households and individuals receiving the minimum wage from one source or another to be increasing in the period analyzed, when the minimum wage underwent an important valorization. They also indicated that minimum wage receivers are concentrated in households in the bottom half of income distribution.

The decomposition further estimated that 64.3% of the 14.6% reduction of household inequality in Brazil as measured by the Gini index was due to the minimum wage, particularly to its valorization. The decomposition also estimated the channels of influence and established that most of the effect ran through basic pensions, whose value is constitutionally pegged to the minimum wage.

We started our investigation by separating three sub-periods, corresponding to different administrations, in the knowledge of significant changes in labor market indicators, especially between the initial sub-period and the two subsequent ones. In the 1990s, there was an important increase in the level of informality and unemployment; this dynamic inverted in 2002, as informality started to reduce, totaling a change of over 12 percentage points from 2002 to 2014, and unemployment dropped. Also the descriptive statistics showed greater inequality reduction and minimum wage increases in the later sub-periods than in the former one. Although we could not track the estimated effects of the minimum wage to these differences, we could not ignore them and thus decided to leave the sub-periods for further investigation. All in all, the distributive impact was felt along the whole 1995-2014 period.

Prima facie, given the substantial importance of the minimum wage to the decline of the still huge income inequality in Brazil, especially through the basic pensions channel, policy changes intent on both undercutting the valorization path and delinking basic pensions from the minimum are likely to endanger the recent and long overdue accomplishments.

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