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Female multidimensional poverty in Brazil in 2015

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Abstract. Social Scientists have been analyzing the feminization of poverty, exploring the determinants of various sources of deprivation experienced by women. This study analyzes female multidimensional poverty in Brazil in 2015 by calculating the level of multidimensional poverty using the Alkire-Foster method. The results showed that 13.63% of Brazilian women were multidimensionally poor in 2015, and that the greatest deprivations they suffered were in the areas of access to formal education and good working conditions in the domestic sphere.

Keywords: Alkire-Foster method, regional economy, feminization of poverty, multidimensional poverty

1. INTRODUCTION

Amartya Sen proposes a conceptualization of development that transcends merely economic considerations, placing the expansion of human freedoms and capabilities at the heart of this process. Sen (2010) argues that to tackle social vulnerabilities—that is, the exclusion and marginalization that individuals suffer—a development perspective is needed in which freedom is central to the analysis. The diffusion of individual freedoms is considered as a mechanism for social emancipation and transformation.

In Sen's development proposal, the expansion of real human freedoms is both an essential end and the primary means for development. In this process, the end goal is the "constitutive role" and the means the "instrumental role" of freedom. According to the constitutive standpoint, development is associated with the expansion of substantive freedoms of individuals—in other words, access to the basic conditions of freedom such as food, education, and health. And from the instrumental point of view, this analysis focuses on the means: how different types of rights and opportunities influence the expansion of individual freedoms and, consequently, development (Sen, 2012).

Poverty is a phenomenon that is unquestionably difficult to conceptualize; it can be examined under an economic lens or in relation to the specificities of the social and political structures in a society. There is no denying the effect of financial and monetary factors on people's experience of poverty, but in order to escape poverty individuals must develop other capabilities and facets in addition to monetary ones (Crespo & Gurovitz, 2002).

The debate on poverty was long restricted to dimensions such as income and consumption, but gradually came to be treated as a universal phenomenon aligned, for example, with gender issues. Poverty affects men and women to different extents. Thus, Sylvia Chant (2006) characterizes poverty as predominantly female, given that women face difficulties in entering the labor market and are more likely to work in the informal sector or be underemployed. Moreover, the historical sexual division of labor overburdens women with domestic responsibilities. In this context, women are exposed to various situations that contribute to shaping the increasingly female face of poverty.

When it comes to understanding why women experience poverty in greater proportion than men, Verônica Azeredo (2010) suggests that there is a tendency to focus on women's lack of capabilities when it comes to earning a living for themselves and, in many cases, for their children. However, we consider that it is essential to analyze the entire set of socioeconomic

conditions in which women are inserted in order to understand the different reasons for the precariousness they experience and, to contribute to the development of resources to overcome female poverty. Keeping this in mind, in this study we ask the following question: To what extent do the socioeconomic conditions to which women in Brazil are exposed affect their experiences of poverty?

This study focuses on understanding the multiple dimensions of the phenomenon of female poverty, beyond just its economic aspect. To this end, we use the Alkire-Foster method. This method is modeled on Sen's ideals of expanding human freedoms and capabilities and allows for the broadest possible analysis of female poverty. The article is divided into four parts, in addition to this introductory section. The first presents a theoretical review of multidimensional poverty and the feminization of poverty. The second explains, step by step, how the Alkire-Foster method is applied. The third section presents and discusses the results. Lastly, the fourth section includes some final considerations.

2. THEORETICAL FRAMEWORK

2.1 Theoretical approaches related to multidimensional poverty

The phenomenon of poverty can be analyzed using different theoretical approaches. Ana Luiza Codes (2008) points out the focus of some of the main theories: subsistence, basic needs, and relative deprivation. When poverty is defined in terms of subsistence, the concept is related to nutrition and human physical requirements, and concerns poverty in its absolute sense, with reference to the basic food basket necessary for physical survival. The basic needs approach goes beyond nutritional and financial aspects, encompassing access to goods and services such as clothing, education, transport, and others. Finally, relative deprivation expands the analysis to the social sphere, taking into account the social contexts in which individuals are situated: how participation, interactions, and social behaviors unfold (Codes, 2008).

Poverty is linked to the minimum conditions that human beings need to live with dignity. By extension, poverty means depriving an individual of these conditions. But what are these minimum requirements? In Brazil, some approaches rooted in the neoclassical vision, which presuppose the maximization of utility, continue to be employed. The more traditional approaches to poverty include those which concentrate on individual income, insofar as this is what enables one to consume and thus to meet one's needs. This identification of "the poor" and "the non-poor" is understood as a unidi-

mensional analysis. However, this approach does not take into account the scale of the phenomenon of poverty or the various dimensions that impede the expansion of individual capabilities and freedoms (Lacerda, 2012).

In this regard, Azeredo (2010) notes that an analysis of poverty grounded entirely in the economic sphere overlooks subjective and qualitative issues that must be addressed and overcome. Thus, an approach that goes beyond material deprivations can enrich our understanding of the population group that is most vulnerable and exposed to the most social risks. Taking this into account, Azeredo distinguishes between absolute and relative poverty from the following perspective:

> [...] Absolute poverty is understood as the lack of access to the minimum [conditions] necessary for physical survival, while in the case of relative poverty this is assured, albeit at insufficient levels, exposing subjects to conditions of vulnerability and social risks. [1]
> (Azeredo, 2010, p. 578)

According to Luana Souza (2013), Sen formulated a new way of analyzing the phenomenon of poverty, associated with the various types of capability deprivations to which people can be exposed. In this regard, Sen's perspective for understanding poverty exceeds the economic (income) dimension and spans other factors, which makes a multidimensional interpretation of poverty possible. Taking into account the broad dissemination of Sen's approach, the World Bank report for the years 2000/2001 incorporated a new proposal for distinguishing between the poor and the non-poor to be used in the formulation of policies aimed at combating poverty. Thus, the phenomenon of poverty has come to be regarded as a multidimensional event based not only on economics but also on the social and political factors that affect the capability deprivations of individuals (Souza, 2013).

Along these lines, Deepa Narayan, Robert Chambers, Meera Shah, and Patti Petesch (2000) provide some reflections on poverty and corroborate the multidimensionality of this phenomenon. These authors argue that an individual's experience of poverty depends on various factors such as age, culture, gender, and countless other cultural, social, and economic aspects. Understood this way, poverty can also be interpreted in terms of the insufficient coverage of an individual's basic needs, causing physical deprivations such as hunger, lack of housing, and others, and thus precluding their wellbeing. Narayan et al. (2000) discusses the psychological impact

1 All translations from the Spanish and Portuguese are by *Apuntes*.

of poverty, which can leave individuals without the capability to have an active voice or independence in situations of exploitation and vulnerability.

Sen (1992) advocates for an approach to development that contrasts with approaches associated with economic growth measured through increases in gross national income (GNI), as well as with analyses centered on income, industrialization, consumption, and technology. For Sen, development is perceived as a process of expanding actual human freedoms. However, he does not overlook the importance of increasing GNI or individual income, which he acknowledges are mechanisms through which people can increase their freedoms but notes they ae not determinants of development (1992). Freedoms are determined by various factors beyond economics, such as access to health services, education, and participation in societal decision-making (civil rights). Sen (1999) argues that for the development process to be effective it is necessary to tackle what he calls "sources of unfreedom":

> Development requires the removal of major sources of unfreedom: poverty as well as tyranny, poor economic opportunities as well as systemic social deprivation, neglect of public facilities as well as intolerance or overactivity of repressive states. (Sen, 1999, p. 3)

Sen (1999) cites certain types of instrumental freedoms that are important for increasing people's capability for freedom, adding that the effectiveness of these instrumental freedoms lies in the interrelations between them. They include political freedoms, economic facilities, social opportunities, transparency guarantees, and protective security.

Political freedoms are reflected in the opportunities through which individuals can participate in decision-making in the environments in which they are located; that is, they encompass civil rights and freedom of expression. Economic freedoms are related to the possibility of using economic resources. Social opportunities affect the expansion of people's substantive freedoms, given that they have an impact on basic needs such as health, food, and education. Transparency guarantees stem from the principle that society should function on the basis of trust, and that the exercise of freedom ought to be permeated by sincerity in relationships; that is, these guarantees intervene to combat illicit transactions, financial irresponsibility, and corruption. Finally, protective security is paramount to preventing the onset of misery; thus, social security must be assured through social benefits for those in need.

The capabilities perspective departs from the utilitarian approach, incorporating other important factors into the analysis of development and

overcoming poverty. In this approach, the focus is shifted from income and access to primary goods towards an analysis oriented to the functionings and capabilities of individuals. Functionings represent all that individuals consider as valuable and desire to have or do. These functionings can vary from elementary desires, such as to be well nourished or to have good health, to more profound issues such as political participation, happiness, and so on. People's capabilities are the various possible combinations of functionings that can be attained—otherwise put, a capability is the freedom that people have to realize the functionings (Sen, 1992).

According to the capabilities perspective, wellbeing is based on the freedom to choose. In this sense it differs from the traditional approach, which positions wellbeing and development as closely related to income. Sen (1992) stresses that "if our concern is with equality of freedom, it is no more adequate to ask for equality of its means than it is to seek equality of its results. Freedom is related to both but does not coincide with either" (p.87). From this perspective, development as freedom entails equal opportunities so that everyone has the self-determination to make the choices that they value most highly, thus helping them to attain wellbeing.

Sen (1992) criticizes the way in which human needs are homogenized without taking into account human specificities, from the physiological to the social. According to him, human beings are not distinguished by the wealth they possess but by a series of individual traits such as skills, ethnicities, social context, gender, and others. Analyzing poverty is complex and requires that due attention be paid to the most affected groups—among them, of course, women. For a long time, poverty and gender were treated independently, both conceptually and scientifically. However, to map out the strategies for overcoming poverty, the gender question cannot be dismissed, in that women are more vulnerable to the effects of this phenomenon. This is shown by the process known as the "feminization of poverty."

2.2 Feminization of poverty: a panorama of female poverty in Brazil

The concept of "feminization of poverty" was first introduced into the debate by Diane Pearce in 1978. This author relates female poverty to the increase in the number of female heads of household. There are also economic, social, and political aggravating factors that culminate in the deprivation of women who, in many cases are the only providers in their families (Ferreira, 2016).

As a result, starting in the 1980s, some feminist groups started to analyze poverty from a gender perspective, given that this problematic presents a series of peculiarities that affect women more intensely than men. In fact, studies do demonstrate that women experience extreme poverty to a greater

extent and that this situation tends to be aggravated by the increase in female households heads. The notion of the feminization of poverty refers precisely to this set of poverty-related specificities that afflict women more acutely than men (Comisión Económica para América Latina y el Caribe [CEPAL], 2004).

International data reveals that more than 70% of the global population living in poverty is female. The results of a study carried out by Augusta Raiher (2016) show that households headed by women suffer from poverty to a greater extent than those with a male head (24.3% and 21.6%, respectively). The study demonstrates that poverty affects women and men in different ways. It is worth mentioning that the sexual division of labor, having assigned the private sphere to women, accentuates gender inequalities in material and financial terms as much as in political and social ones (Cepal, 2004). The International Labor Organization (ILO) notes that women face disadvantages related to gender that render them more susceptible to poverty and social vulnerabilities (Organización Internacional del Trabajo [OIT], 2006). This occurs because of the domination of the male gender and the sexual division of labor, both of which are deeply rooted in societies and are ultimately reflected in the ways that poverty impact women. For this reason, men and women do not have equal opportunities in a wide range of domains, whether in the job market, in political representation, or in the family environment itself.

According to Brazil's 2000 census, 25% of households had female heads at that time. By 2010 this proportion had increased to 38%, and, come the 2013 National Household Sample Survey (Pesquisa Nacional por Amostra de Domicílios, PNAD), to 39%. The trend is palpable: in increasing numbers, women are heading households. There are two main factors behind the rise in female poverty and the accompanying increase in female household heads. First, because these women end up with sole financial responsibility for their families; and second, because they receive less pay than men. Therefore, more and more, poverty has a female face (Raiher, 2016).

According to data from the Gender Equality Observatory for Latin America and the Caribbean, Brazil's femininity index of poor households[2] in 2018 was 111.9; that is, for every 100 men living in poverty in Brazil, there were 111.9 women in a similar situation. This statistic

2 The femininity index of poor household expresses the indigence gap between men and women between 20 and 59 years of age. The level of indigence is measured in terms of the additional income per capita necessary for an individual to meet their basic needs through the acquisition of a food basket (CEPAL, 2018).

shows that Brazilian women are more vulnerable to poverty than men (CEPAL, 2018).

According to 2005 data from the PNAD, the number of households led by women increased by 35% between 1995 and 2005. This rise led to an intensification of poverty and social segregation. Elana Silveira and Suzana Marques (2013) point out that motherhood and the need to join the labor market are linked to the rise in poverty among women who head their households. This is true because these women are the sole providers and caregivers for their children, which leaves them exposed to underemployment. The authors add that the feminization of poverty is intersected with questions that transcend gender, such as racial and social issues, that prevent women from developing their capabilities (Silveira & Marques, 2013).

The rising numbers of households headed by women can be explained by a number of factors, among them changes in family structure, the political and social empowerment of women, greater female involvement in the job market, and higher divorce rates. Thus, female independence and the role of women as financial providers for their families has created difficulties in their managing the household alone, given society's preconceived idea that women are less capable (Silveira & Marques, 2013).

The ILO (OIT, 2006) has conducted studies that link gender to people's vulnerability, and to measures for overcoming it. For this organization, the main gender determinants of female poverty are the devaluation of the work done by women, women's difficulty integrating into the job market, inequality associated with participation in decision making, and women's lack of access to productive resources. Maria Ferreira (2016) cites evidence that relates the feminization of poverty with the ways in which women access the job market. First, there are more women in temporary or part-time positions. As a result, there is clear pay discrimination based on gender, to the detriment of women. Moreover, there is evidence of a greater concentration of women in work that requires fewer skills and is therefore lower paid. In view of this, the author argues that studies on the feminization of poverty should also include an analysis of the female labor market.

The institutionalization of gender discrimination in the labor market intensifies the effect that poverty has on women. The assignment of domestic tasks to women lends itself to a reduction in their prospects of inclusion in the labor market, as they have less time to invest in their professional training and qualifications, or to take part in non-domestic work. In this context, women form a differentiated group among the poor, as they earn less than or are financially dependent on their spouses or partners, and are thus more exposed to poverty (OIT, 2006).

Chant (2006), employing a gender focus, stresses that poverty cannot be measured and understood just in terms of family income since the feminization of poverty is not reducible to lack of income alone. The author adds that to better understand the impoverishment of the female part of society, it is necessary to analyze multidimensional considerations related to the expansion of capabilities, access to a livelihood, subjectivities, and aspects linked to gender vulnerabilities, among others.

The present study takes a multidimensional approach to poverty among woman in Brazil, taking into account that women are more exposed to the effects of the phenomenon of poverty than are men.

3. METHODOLOGY

The instrument employed in this study was devised by Sabina Alkire and James Foster (the AF method). It permits the calculation of a multidimensional poverty index by taking into account the numerous dimensions of people's lives. The instrument is modeled on Amartya Sen's capabilities approach, as discussed above. In this study, it is employed to carry out a multidimensional analysis of the condition of female poverty in Brazil.

The Alkire and Foster (2011) method for measuring poverty can, broadly speaking, be divided into two main steps. First, out of a universe of subjects, the individuals who are poor and those who are not poor must be identified. Then an index of all the pertinent data referring to the subjects who were categorized as poor must be prepared. When using this this method, two cutoff lines are used to detect those individuals who are multidimensionally poor. The first is the cutoff set for each indicator of analysis—that is, the definition of when the individual is deprived or not for a given indicator. The second cutoff is related to the number of indicators in which the individual must suffer from deprivation to be considered multidimensionally poor.

According to Alkire and Foster (2011), the following 12 steps are necessary to perform a multidimensional analysis of poverty:

1. Select the unit of analysis (individual, household, neighborhood, among others). In the present analysis, Brazilian women are the unit of analysis.
2. Select the dimensions. This study employs three dimensions: "education and work," "health and recreation," and "housing conditions."
3. Choose the indicators for each of the dimensions selected in the second stage. In this study, the 18 indicators used are provided in Table 1.

4. Set the first poverty cutoff line: that is, determine which individuals are considered as deprived and which are not according to each indicator. This information is also provided in Table 1.
5. Execute Step 4: employing the criteria established in the first poverty line, detect which individuals are deprived (D) and which are not deprived (NP) according to each indicator.
6. Count the number of indicators according to which each individual suffers deprivations.
7. Set the second poverty cutoff line (k): this stage determines the number of indicators and dimensions in which individuals must be deprived to be considered multidimensionally poor. In the present study, in line with normal practice when using the AF method, the second cutoff line was set as deprivation in one-third or more of the dimensions. Therefore, a woman who is deprived in six or more dimensions will be considered multidimensionally poor.
8. Apply poverty cutoff k: this means including the individuals considered poor and omitting those who are not. Zeros are assigned to the indicators or dimensions of non-poor individuals.
9. Calcutate the headcount (H): the proportion of people who are multidimensionally poor, as determined by poverty cutoff k, divided by the total population studied (n):

$$H = \frac{q}{n} \qquad (1)$$

10. Calculate the average poverty gap (A): the average number of deprivations that the multidimensionally poor person suffers; that is, the relative number of deprivations that poor people experience at the same time. This is calculated by adding up the total number of deprivations that each person suffers, and dividing it by the total number of multidimensionally poor people:

$$A = \frac{C(k)}{q} \qquad (2)$$

11. Calculate the adjusted headcount (Mo): variation from 0 to 1. The closer the result is to 1, the higher the rate of poverty. This is calculated by multiplying the poverty headcount (H) by the average poverty gap (A).

$$Mo = A \times H \qquad (3)$$

12. Do a breakdown by indicator to determine the impact of each indicator on overall female poverty.

As noted, in this study the indicators are grouped into three dimensions. The first refers to education and work; the second, to health and recreation; and the third, to housing conditions. Table 1 outlines the dimensions, indicators, and criteria employed in each indicator to determine whether individuals are deprived. Therefore, as proposed by Alkire and Foster (2011), a woman who is deprived in one-third of the indicators (six, in this case) is considered multidimensionally poor.

Table 1
Dimensions, indicators, and criteria for deprivation under the AF method

Dimension	Indicator	Who is deprived?
Education and Work	1. Years of education	Woman who has not completed 11 years of schooling
	2. Hours worked	Woman who works 45 hours per week or more
	3. Domestic work	Woman who dedicates more than 16 hours per week to domestic chores
	4. Pension	Woman who does not contribute to a pension fund
	5. Formal work	Woman who does not have a formal job
	6. Commuting	Woman whose commute to work takes more than one hour
Health and Recreation	7. Infant mortality	Woman who suffered a stillbirth after seven or more months of pregnancy
	8. Physical activity	Woman who has not practiced any form of physical activity in the last year
	9. Drainage	Home that is not connected to a sewerage or rainwater drainage system, or to a septic tank connected to the sewerage or rainwater drainage system
	10. Running water	Home that does not have running water in at least one room
	11. Garbage disposal	Home from which garbage is not collected directly or indirectly

Housing Conditions	12. Washing machine	Home that does not have a washing machine
	13. Construction material (walls)	Home that is not constructed from bricks or lumber
	14. Internet	Woman who has not used the internet in the last three months
	15. Refrigerator	Home that does not have a refrigerator
	16. Cell phone	Woman who does not possess a cell phone for personal use
	17. Cooking fuel	Home that does not have bottled gas, piped gas, or electricity for cooking
	18. Lighting	Home that does not have electricity (from the grid, generator, solar)

Source: compiled by authors based on bibliographic research[3] carried out in 2020.

The "education and work" dimension encompasses the following indicators: "years of education," "hours worked," "domestic work," "pension," formal work," and "commuting." In the "years of education" indicator, a woman is considered deprived if she has not completed 11 years of schooling, i.e., completed secondary school.[4] In the case of "hours worked," a woman is regarded as deprived if she works 45 hours or more[5] per week. In addition, a woman who dedicates 16 hours per week to domestic chores is classed as deprived in the "domestic work" indicator, since this is above the national average of 15.27 hours per week (PNAD, 2015). As far as the "pension" indicator is concerned, a woman who does not pay into the Brazilian pension system as part of her primary job is considered deprived. Along similar lines, under the "formal work" indicator, a woman whose primary job is not formal is considered as deprived. In turn, a woman whose daily journey from her home to her workplace takes more than one hour is perceived as deprived in the "commuting" indicator.

The indicators "infant mortality," "physical activity," "drainage," "running water," and "garbage disposal" comprise the "health and recreation" dimension. A woman is deemed to be deprived in the "infant mortality" indicator if she suffered a stillbirth after seven or more months of pregnancy (the interval set by PNAD for the information it collects). According to the "physical activity" indicator, a woman who has not practiced some form of

3 The dimensions and indicators were devised based on previous studies that use the AF method to analyze multidimensional poverty in Brazil: Ferreira & Marin (2016); Serra, Yalonetzky & Belik (2017); Brites, Moura, da Silva, Marin, & Lanza (2017), and Toledo & Rodrigues (2020).

4 This refers to individuals who have completed at least primary and secondary schooling (Toledo & Rodrigues, 2020).

5 Deprivation based on the studies of Ferreira and Marin (2016) and Brites *et al.* (2017)

exercise (outside working hours or school physical education) in the last year is considered as deprived. Under "drainage," a woman is judged deprived if she lives in a home that is not connected directly to the sewerage or the rainwater drainage systems, or does not have a septic tank that is connected to the sewerage or the rainwater drainage system (that is, if she relies on a rudimentary pit, ditch, or direct disposal into a waterbody, etc.). In the case of the "running water" indicator, a woman is marked as deprived if she does not have access to running water in at least one of the rooms in her home. Finally, she is considered as deprived in the "garbage disposal" indicator if she lives in a home from which the garbage is not collected either directly or indirectly (that is, if she relies on burning, direct disposal on wasteland or into a waterbody, etc.).

The third and final dimension in this analysis is "housing conditions," which encompasses the following indicators: "washing machine," "construction material (walls), "internet," "refrigerator," "cell phone," "cooking fuel," and "lighting." For the "washing machine" indicator, a woman is considered deprived if she lives in a home that does not have a washing machine. Under "construction material (walls)," a woman is categorized as poor when the predominant material used in the construction of her home's external walls is not brick or lumber[6] (that is, the main material is non-reinforced rammed earth, reclaimed wood, matting, etc.). Meanwhile, a woman who has not used the internet over the last three months is considered deprived under the "internet" indicator. As to the "refrigerator" indicator, deprivation refers to those women who do not have a refrigerator in their homes. Under the "cell phone" indicator, a woman who does not have a cell phone for personal use is deprived. For the "cooking fuel" indicator, a woman is classified as deprived if she lives in a home that does not have bottled gas, piped gas, or electricity as cooking fuel. Finally, for "lighting," a woman who lives in a dwelling that does not have electricity (mains, generator, solar) is classed as deprived.

The cutoff point for the analysis was chosen in accordance with the availability of data in our source: PNAD statistics. Its most recent survey, which covers all the aspects analyzed in this research, was carried out in 2015. All the dimensions, indicators, and deprivation criteria were applied to 183,681 women in Brazil: 19,012 women from the central-west macro-region, 28,033 from the south macro-region, 28,520 from the north macro-region, 54,768 from the southeast macro-region, and 53,348 from the northeast macro-region. In the next section, we present our main results.

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6 Definitions of deprivation based on the studies of Ferreira and Marin (2016) and Brites et al. (2017).

4. ANALYSIS AND DISCUSSION OF RESULTS

After applying the methodological steps described in the previous section, we obtained the poverty headcount (H), the average poverty gap (A), and the adjusted poverty headcount (Mo), which are the main metrics employed in the present analysis. In an earlier study, Serra, Yalonetzky, and Belik (2017), found that 12.7% of the Brazilian population was multidimensionally poor in 2010. More recently, Toledo and Rodrigues (2020), found that in 2014, 15.3% of all people in Brazil were multidimensionally poor. Our results are similar. After calculating the poverty headcount (H), we find that 13.63% of the Brazilian women analyzed were multidimensionally poor in 2015.

As noted, "A" represents the average poverty gap; that is, it reflects the intensity of poverty by showing the number of indicators in which the poor are deprived. Therefore, in Brazil, women considered multidimensionality poor are subject to deprivation in 38.96% of the indicators studied. Ferreira and Marin (2016), with reference to the poverty gap in their study, observe that in both 2001 and 2011 women considered multidimensionally poor were deprived in 40% of the indicators selected. If this previous study is taken as a starting point, our research shows evidence of a reduction in the average female poverty gap by 2015.

Using the Alkire-Foster method, the level of multidimensional poverty is indicated by "Mo," which represents the intensity of the deprivation that poor women suffer in relation to the maximum level of deprivation that they could experience. Thus, in Brazil, the overall hardship that women experienced in 2015 represented 5.3% of the maximum deprivation to which they could have been subject.

As shown in Table 2, in the southeast region, 6.17% of the women analyzed were considered multidimensionally poor, the lowest percentage of all of Brazil's regions; this is followed by the south, at 6.9 %, and the central-west, at 8.6%. On the other hand, the northeast region has the highest rate of poverty, with 22.37% of the women analyzed considered to multidimensionally poor, followed by the north, with 21.49% of women in this category.

Table 2
Results of the AF Method by macro-region

	Southeast	**South**	**Central-west**	**North**	**Northeast**
M	0.0617487	0.069632	0.086524	0.214972	0.223757
A	0.375575	0.372752	0.371327	0.396238	0.395763
Mo	0.023179	0.025956	0.032129	0.085180	0.088555

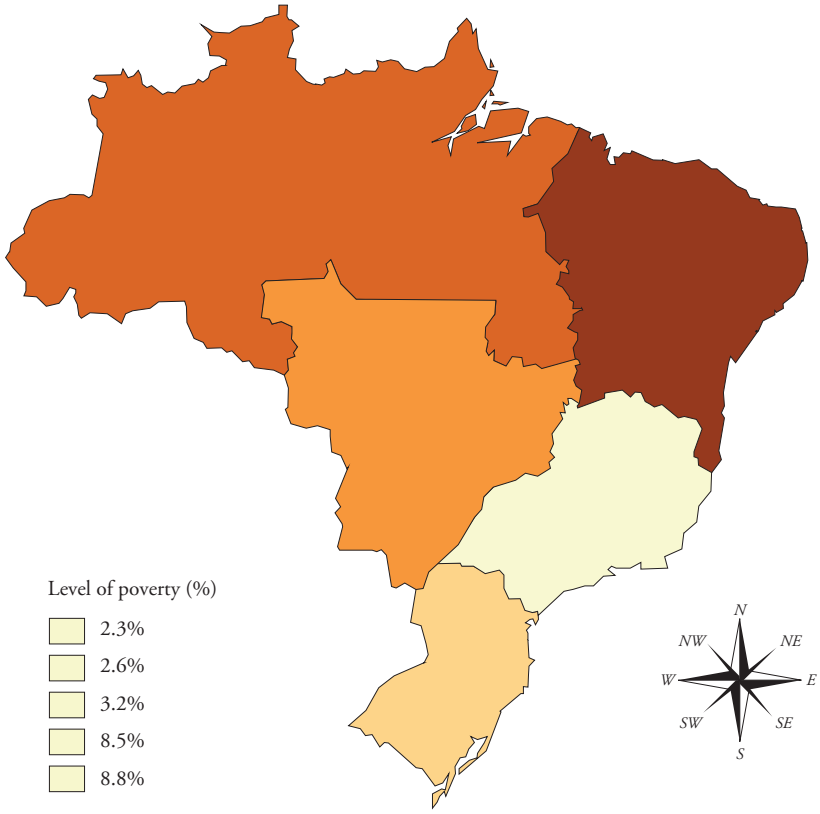
Source: compiled by authors based on the PNAD (2015).

In the study by Ferreira and Marin (2016), the authors conduct a comparative analysis of the evolution of female multidimensional poverty in Brazil between 2001 and 2011, and highlight the areas with the highest proportion of multidimensionally poor women in the start and end years. In 2001, the region with the highest proportion of women in multidimensional poverty was the northeast, while ten years later it was the north. In a later study, Brites et al. (2017) analyze the same dimensions and indicators as Ferreira and Marin (2016) for female dimensional poverty in 2012, concluding that Brazil's south region had the lowest rate of multidimensional poverty among women, while the north had the highest. In turn, for 2015, in this study we find that the northeast was home to the largest proportion of multidimensionally poor women that year, and the southeast had the fewest. Thus, over the years, the largest poverty headcount has alternated between the north and the northeast, while, conversely, the south and the southeast have both by turns had the lowest rates.

Meanwhile, with respect to the average poverty gap, the southeast, south, and central-west regions record similar figures. In each, women considered multidimensionally poor are deprived, on average, in 37% of the indicators analyzed. And the north and northeast regions have a somewhat greater intensity of poverty, in that women living there are deprived in an average of 39% of the indicators. With regard to the average poverty gap, there is little variation between the indicators estimated for the different regions; thus, on average, the women categorized as multidimensionally poor suffer similar deprivations. In their study, Ferreira and Marin (2016) note that, in 2011, the north region had the highest poverty gap (A) among women in Brazil, which corresponds with the result obtained in the present research.

As can be seen in Figure 1, the region with the highest poverty rate is the northeast, where the proportion of deprivations that multidimensionally poor women suffer represents 8.8% of the maximum possible level of deprivations.

Figure 1
Adjusted poverty headcount (Mo) by macro-region (2015)



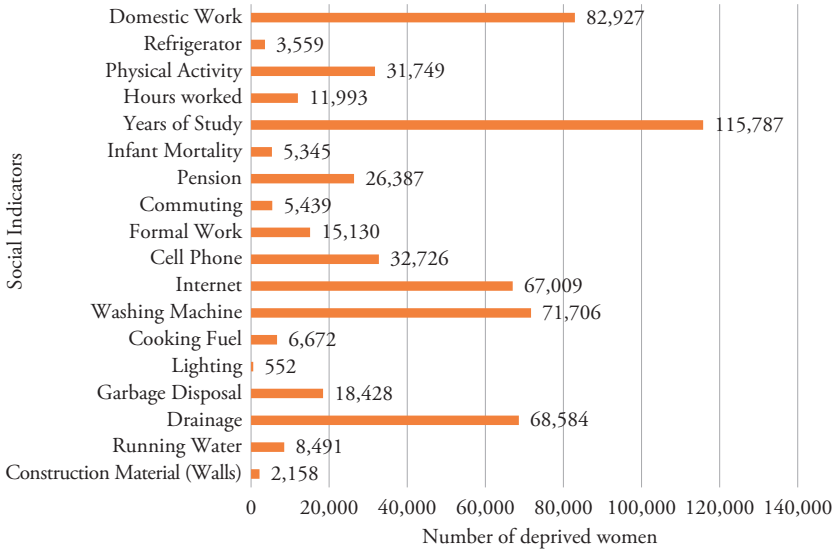
Source: compiled by authors based on data from PNAD (2015).

By this metric, the southeast region has the lowest level of poverty, at 2.3%, followed by the south and central-west, with rates of 2.6% and 3.2%, respectively. The north region has the second-highest rate of female multidimensional poverty, at 8.5%. It is worth noting the results of Toledo and Rodrigues (2020), who conclude that the region with the highest level of poverty is the north, followed by the northeast; meanwhile, in line with our results, they find that the region least afflicted by poverty is the southeast.

Figure 2 shows that the indicator according to which women were most deprived in Brazil is "years of study": 63% of the women analyzed suffered deprivation in this indicator. Next comes "domestic work," in which 45% of the women in the sample were deprived. The third-highest level of hardship is witnessed in the "washing machine" indicator, encompassing 39% of the women. Finally, "drainage" and "internet" are another two indicators

in which there are high levels of deprivation in Brazil: 37.3% and 36.5%, respectively.

Figure 2
Number of Brazilian women suffering from deprivations by indicator, 2015



Source: compiled by authors based on data from PNAD (2015).

In turn, "lighting," which denotes access to electricity, is the indicator in which the women were least deprived; only 0.3% of the sample suffered this form of deprivation. This same indicator also presented the lowest rates of deprivation at the regional level; the south had the lowest rate of all, at 0.014%. In the comparative study by Alcázar et al. (2017) on multidimensional poverty in Brazil between 2000 and 2010, the authors find that insufficient access to electricity fell from 14% in 2000 to 4% in 2011. These results reflect the success of universal public policies aimed at expanding access to electricity in Brazil, especially in rural parts of the country.

The high rate of access to lighting may be related to the federal government program "Luz

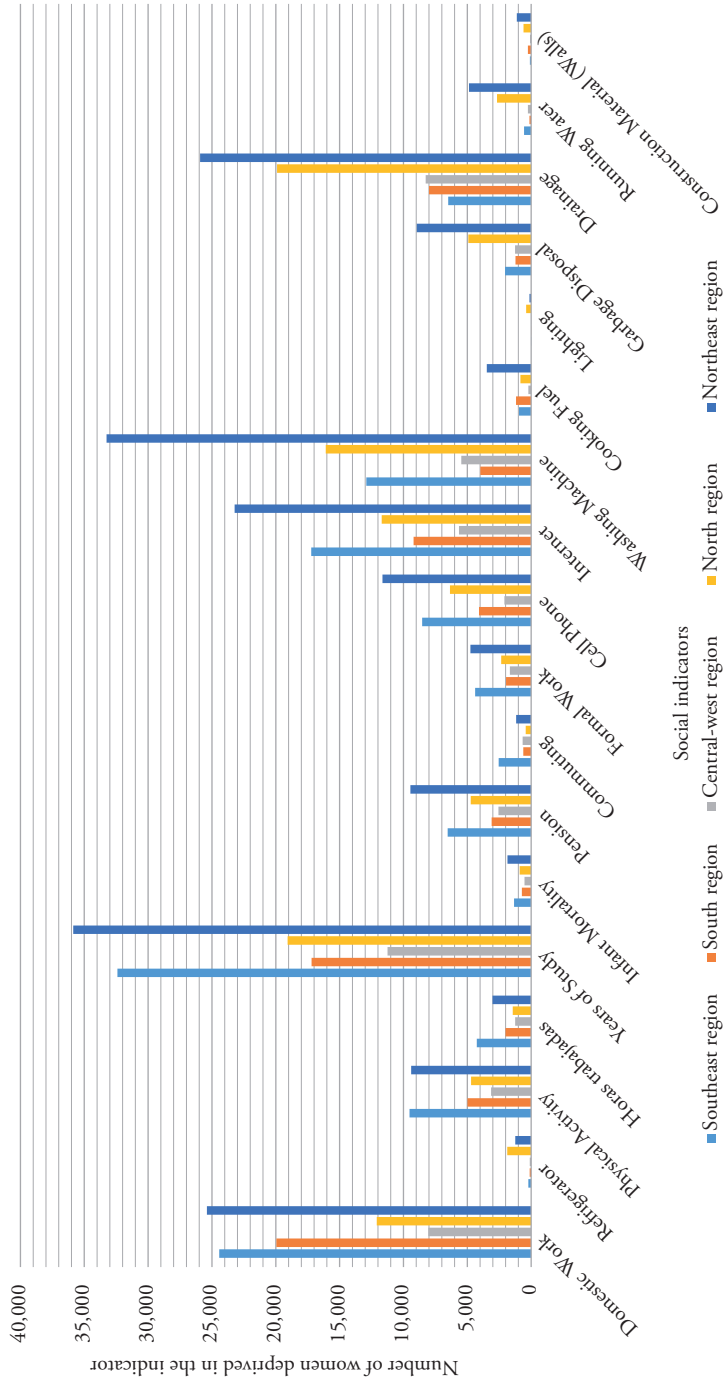
Para Todos" (Light For All), which was implemented in 2003 and aims to achieve universal access and use of electricity in Brazil. By 2018, the program had benefited 3,405,169 families—approximately 16.2 million individuals throughout the country (Ministério de Minas e Energía, 2018). Improved access to electricity has positive repercussions on various aspects of people's lives; Serra et al. (2017) highlight the following:

> More than comfort in the home in terms of lighting and the use of durable goods, access to energy enables better sanitation conditions such as the installation of well pumps, with running water in the home. In addition to the direct benefits of residential [electricity] service, service to rural schools, which is among the program's priorities, facilitates increased in access to education, and even allows schools to operate in the evenings for the adult population (Serra et al., 2007, p. 11).

The indicator with the second-lowest level of deprivation was "construction material (walls)," encompassing just 1.2% of women in the sample. This result may be related to the federal housing program introduced under President Lula da Silva in 2009, better known as "Minha Casa, Minha Vida" (My House, My Life). This federal government initiative, in conjunction with the Caixa Econômica Federal, provided access to housing through construction subsidies. Between its creation and the start of 2018, the program provided more than 4 million residential units (Ministério do Desenvolvimento Regional, 2019). The other three indicators with low deprivation headcounts were access to a "refrigerator," at 1.9%; "commuting" to work, at 3%; and access to "running water," in which 4.6% of the women were deprived.

Figure 3 shows deprivations by indicator, broken down by region. In the southeast region, the indicators in which women were most deprived are their "years of education" (59%), time devoted to "domestic work" (44.6%), access to the "internet" (31.4%), possession of a "washing machine" (23.6%), and engagement in some form of "physical activity" (17.4%). In this same region, the most recurrent deprivations were "lighting" (0.02%), "construction material (walls)" (0.18%), possession of a "refrigerator" (0.4%), access to "running water" (1.0%), and use of "cooking fuel" (1.7%).

Figure 3
Number of women deprived by indicator and Brazilian macro-region (2015)



Source: compiled by authors based on data from PNAD (2015).

In turn, the indicator with the highest rate of deprivation in this region was "years of study" (61.3%). Meanwhile, in the south region the most common deprivations were those corresponding to "domestic work" (46.2%), "internet" access (32.8%), access to some form of "drainage" (28.5%), and participation in "physical activity" (17.8%). Access to "lighting" is the indicator in which women who live in the south region were least deprived, corresponding to just 0.014% of the sample. Likewise, women in this region presented low rates of deprivation for indicators such as possession of a "refrigerator" (0.43%), access to "running water" (0.5%), "construction material (walls)" (0.9%), and time spent "commuting" (2.2%).

In the central-west region, the indicator in which women were most deprived is again "years of education" (59.2%), followed by "drainage" (43.4%), "domestic work" (42.3%), "internet" access (29.7%), and possession of a "washing machine" (28.8%). And the indicators in which women in this area experience least deprivation were access to electrical "lighting" (0.036%), housing "construction material (walls)" (0.46%), possession of a "refrigerator" (0.55%), use of a "cooking fuel" (1.15%) and access to "running water" (1.35%).

As can be seen in Figure 3, the north region is the only one in which "years of study" is not the indicator in which women were most deprived. In turn, the "drainage" indicator showed the highest level of deprivation not only in this region but in all others as well. Specifically, 69.77% of women in the north region lived in homes that did not have high-quality drainage. "Years of education" was the indicator with the second-highest deprivation headcount in the region: 66.87% of women experienced this form of hardship. Possession of a "washing machine" (56.40%), "domestic work" (42.40%), and access to the "internet" (41.03%) were the other indicators in which women in the north region presented high levels of deprivation.

Conversely, the indicators in which women in the north region suffered the least deprivation were as follows: "lighting" (1.37%), "commuting (1.5%), "construction material (walls)," (2.0%), "cooking fuel" (2.95%), and "infant mortality" (3.1%). It is interesting to note that the north is the only region in which possession of a "refrigerator" was not among the indicators in women were most deprived: just 6.6% of the women studied are deprived in this indicator. Meanwhile, 9.3% of the women do not have access to running water.

Crucially, the northeast was the region in which the worst results were recorded across most indicators. The indicator in which northeastern women were most deprived is "years of study" (67.22%). Possession of a "washing machine" was the indicator with the second-highest percentage of depri-

vation: 62.33% of women. The third-highest headcount in the region was found in the "drainage" indicator, at 48.60%. High levels of hardship were also evident in the time that women in the northeast dedicated to "domestic work": 47.60% were deprived according to this this indicator. Finally, a slightly smaller proportion, 43.53%, of women residing in the northeast region did not have "internet" access: the highest level in the country.

As to the indicators in which women in the northeast experienced the lowest levels of deprivations, the most salient were "lighting," at 0.25%; "construction material (walls)," at 2.1%; time spent "commuting," at 2.2%; possession of a "refrigerator," at 2.3%; and "infant mortality," at 3.5%. Another salient finding is that 9.3% of women in northeast Brazil did not have access to "running water" in 2015.

In sum, a few key findings standout:

- Levels of deprivation in the indicator of women's "physical activity" were not especially high in the north, northeast, and central-west regions, but were considerably higher in the south and southeast regions: in these two regions, more than 17% of women were deprived in this respect.
- Possession of a "refrigerator" was among the indicators analyzed in which women suffered the least deprivation in Brazil, at just 1.9%. However, breaking down this result by regions, we find that there was a pocket of deprivation in the north region, where 6.6% of women did not have a refrigerator.
- Access to "running water" was another indicator in which levels of deprivation among Brazilian women were relatively low: 4.6% of women were deprived of this utility. But at the regional level, a noticeable level of this deprivation was detected in the north (9.3%) and northeast (9.1%) regions in comparison with elsewhere (south: 0.5%; southeast: 1%; central-west: 1.35%).
- "Years of education" was the indicator in which Brazilian women were most deprived, in that 63% of those analyzed had not completed secondary schooling (11 years of study). Deprivation in this indicator was high in all regions: there is nowhere in Brazil where the headcount was any lower than 59%.
- Domestic work was the indicator with the second-highest level of deprivation among Brazilian women. In all regions, at least 42% of women dedicated more than 16 hours per week to housework. In Brazil, women spent over 95% more time than men on home care. On average, women allocated 19.67 hours per week to housework, whereas men spent just 9.99 hours on such activities.

- The indicator referring to possession of a "washing machine" denotes a significant want in Brazil, since 39% of women did not have this appliance in their home. What is more, at the regional level, it is notable that women in the northeast and north were even more deficient in this regard: 62.33% and 56.33% of women living in these regions did not have a washing machine, respectively. These devices are very important for women as a way of minimizing the time they spend on domestic work.

In light of the above, it is apparent that deprivations do not affect women and regions uniformly. Brazil is a heterogeneous country in every sense, and this applies equally to subnational needs. For example, women in the south and southeast regions are more deprived in terms of physical activities, while those in the north and northeast areas have more difficulties in accessing running water and owning a washing machine. However, there are some indicators in which patterns of deprivation are replicated throughout the country, such as access to formal education and the distribution of domestic work. In general terms, these two indicators of deprivation are interconnected: by investing more hours in housework and caring for children, relatives, and husbands or partners, women end up having less time to spend on education or professional training, or for entering the job market.

5. FINAL CONSIDERATIONS

This study set out to perform a multidimensional analysis of the phenomenon of female poverty in Brazil for 2015. Applying the Alkire-Foster methodology, we found that 13.63% of the Brazilian women analyzed were multidimensionally poor that year. The region with the highest rate of multidimensional poverty was the northeast, in which 22.37% of women experienced such poverty. In contrast, the southeast had the lowest population of multidimensionally poor women (6.17%).

From our calculation of the average poverty gap, we found that Brazilian women who were estimated as multidimensionally poor were deprived, on average, in 38.96% of the indicators analyzed in this study. With reference to the objective of this research—to calculate the level of multidimensional poverty among women in Brazil—we found that the overall level of deprivation among Brazilian women represented 5.3% of the maximum possible level to which they could be subject in respect of our indicators. We observed that the regions with the highest and lowest levels of poverty were, respectively, the northeast, with a proportion of 8.8%, and the southeast, with 2.3%.

The two indicators in which women were least deprived in Brazil were "lighting" and "construction material (walls)," with respective deprivation

rates of just 0.33% and 1.2% of women. These results may be associated with two federal social programs that directly influence these areas: Luz Para Todos and Minha Casa, Minha Vida. By contrast, the indicators in which women in Brazil were most deficient were "years of education" (63%), "domestic work" (45%), "washing machine" (39%), drainage" (37.3%), and "internet" (36.5%). Analysis of multidimensional poverty indicators is essential for the formulation of public policies, both universal and targeted.

Some reflections are necessary in regard to the indicators in which Brazilian women experience most deprivation. The excessive domestic workload of women in a Brazil is a consequence of a patriarchal society and the sexual division of labor. The time that women spend on domestic chores and/or childcare affects their availability to advance in their education and gain qualifications; therefore, it negatively affects their access to social and economic opportunities. In this context, it can be argued that possession of a washing machine is essential, since it reduces women's housework burden.

Likewise, the notable lack of internet access among women is problematic, since in our globalized world this is one of the primary tools for accessing information and education. Thus, the set of deprivations in which women are most strongly affected in Brazil is closely linked to the female role in the private sphere, and ultimately hampers the progress of women in the sphere of education.

One of the limitations of this study concerns a lack of access to indicators related to the public health situation of women, since the databases we used do not provide such information. Finally, this research points to the need for targeted social policies that tackle the indicators in which women suffer the highest levels of deprivation in Brazil, with a view to reducing female poverty. Some public policies have the ability to improve the quality of life of women: for example, investment in urban infrastructure (with incentives for digital inclusion and the improvement of basic sanitation) and education (increase in kindergartens and promotion of night schools for young mothers, in particular). Therefore, the state must act to minimize the inequalities and vulnerabilities suffered by women in Brazil, and this should be reflected in successful social programs and policies of the kind implemented by previous governments, such as Luz Para Todos and Minha Casa, Minha Vida.

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