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Youth and the Future of Brazil: an Analysis of the Impact of Multidimensional Poverty in the Macroregions (2015)

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Abstract. Given the representativeness of Brazil's youth population and the various socioeconomic vulnerabilities they face, the present study aims to provide a multidimensional measure of poverty for this population group across the country's five macroregions. To this end, the Alkire-Foster method is used along with a database from the National Household Sample Survey (Pesquisa Nacional por Amostra de Domicílios, PNAD, 2015). The sample consists of 85,388 individuals, analyzed across four dimensions and twelve indicators of deprivation. The results indicate that the incidence of poverty among Brazilian youth is 11.4% and that the country's MPI is 4.5%, with the North and Northeast macroregions presenting deprivation indices higher than the national average. The indicators that most contributed to

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deprivation are *internet access*, *educational level*, *access to a sewerage network*, and *garbage collection*.

Keywords: Multidimensional poverty; young adults; Alkire-Foster method; Brazil.

Introduction

Since the second half of the 20th century, there has been an increase in the analysis of development and poverty from the perspective of the economic sciences. Today, there is general awareness that poverty, as an economic phenomenon, should not be treated unidimensionally. In the *Report by the Commission on the Measurement of Economic Performance and Social Progress*, Stiglitz, Sen, and Fitoussi (2009) argue that approaches to social questions such as the welfare state, poverty, and misery must, of necessity, be plural, taking into account the various factors that comprise the life of an individual and their social inclusion.

From this perspective, the Indian economist Amartya Sen (2013) proposes a theoretical basis for relating a complex set of components that determine an individual's way of life, invigorating the debate about the influence of political, social, cultural, and moral factors. Deprivations and instrumental freedoms are among the most-studied aspects within the context of multidimensional poverty analysis; the set of instrumental freedoms—composed of political freedoms, economic facilities, social opportunities, transparency guarantees, and protective security—allow individuals to live in the way they want through guaranteed rights and opportunities. Thus, overcoming individual deprivations by strengthening these freedoms is essential for social and institutional actions and for alleviating poverty.

In the case of Brazil, despite progress in tackling socioeconomic vulnerabilities and inequalities, multiple forms of deprivation remain in evidence across the population (Serra, 2017; Fahel, Teles, & Caminhas, 2016). In this context, youth are particularly salient: they constitute a special population group in both quantitative and qualitative terms, accounting for more than 20% of the Brazilian population (Instituto Brasileiro de Geografia e Estatística [IBGE], 2015) and representing significant potential for development. But because they are at a stage of their lives marked by transition and inconsistencies, entering the job market and becoming independent from their parents for the first time, young people comprise a vulnerable group in both socioeconomic and political terms (Camarano, Mello & Kanso, 2006; Gadea *et al.*, 2017).

In view of the size of Brazil's youth population and its importance to the country's development, the aim of this study is to analyze the incidence and intensity of multidimensional poverty affecting this population group, drawing on Sen's (2013) theoretical contributions. This study analyzes of poverty levels in the five macroregions of Brazil. To this end, the Alkire-Foster model is used to estimate the incidence of poverty among Brazil's youth population, and to identify the main sources of deprivations. The results

point to a higher incidence of deprivations in the North and Northeast macroregions, which are traditionally affected by socioeconomic vulnerabilities to a greater extent than the other macroregions. Moreover, the study explores the impact of standard of living and educational indicators on the socioeconomic reproduction capabilities of young people in the different macroregions.

This article is divided into four sections, in addition to this introduction. Section one sets out the theoretical framework for the model. Section two analyzes the methodological procedures employed to estimate the incidence of poverty. Section three analyzes the main results of the study. And finally, Section four presents the main conclusions.

1. Theoretical basis

The muldimensional character of poverty and the promotion of freedoms on the path to development

The rise of the capitalist system brought about technological progress and possibilities for wealth accumulation but, perversely, it also engendered poverty and misery, especially among the working classes. Moreover, starting with the Industrial Revolution, exploration of the causes and dimensions of poverty began to gain prominence on the government policy agendas of modern nations (Codes, 2008).

Alongside the transformations that occurred in the political and social spheres, Adelman (2001) and Stiglitz *et al.* (2009) highlight changes to the theoretical perspectives on development which led to a new focus on the multidimensional character and the non-linear behavior of poverty as a phenomenon. Poverty was measured primarily on the basis of levels of income until the mid-20th century (Crespo & Gurovitz, 2002), but the debate and research agenda gradually expanded to incorporate a focus on multiple economic and social factors as part of its analysis and measurement (Crespo & Gurovitz, 2002). Moreover, as Meier and Stiglitz (2002) observe, studies on development made great strides in the postwar period, leading scholars to a better understanding of its characteristics, causes, and quantification.

This evolution in research allowed for changes to the conceptualization of growth targets, which had long been limited to increases in gross domestic product (GDP) and income per capita. Thus, important advances were made in debates around issues such as poverty reduction, knowledge, capabilities, and freedoms. New indicators were formulated in an attempt to understand, qualitatively and quantitatively, the incidence of these complex phenomena. Worthy of mention in this regard is the index of gross national happiness

(GNH), devised in the 1970s, and the human development index (IDH), created in the 1990s.

Townsend (1979) was one of the pioneering scholars in the debate around poverty measurement. This author argued that deprivation on the individual or societal level was associated with the most basic needs for human survival, such as access to a healthy diet and to safe housing. When individuals lack the most basic conditions for survival, they are excluded from the general standard of living in a society, and, as a result, they are deprived of their freedoms.

One of the most well-known multidimensional approaches at present is that of Amartya Sen (2013), who treats poverty as the deprivation of an individual's basic capabilities, and reflects on the phenomenon from a legal, political, and social standpoint. His contribution, which goes beyond a simplistic linear approach, has furthered our understanding of poverty as an aggregation of multiple factors. Sen's proposals have inspired pluralistic approaches to poverty that refute the exclusivity of income in processes of deprivation, and stress the importance of a lack of opportunities for an individual's standard of living. Multiple individual needs lead to a short existence full of deficiencies, characterized by feelings of helplessness, vulnerability, incapability, social displacement, and hopelessness (Wilber, 1975; Sen, 2013).

Sen (2001) highlights the concept of freedom as the means and the end of development; that is, as a means of achieving it as well as an end in itself. Development, in his view, is multidimensional, and can only be achieved when the individual, in full enjoyment of their capabilities, is freed from precarious conditions. In other words, freedom is an instrument for overcoming individual deprivations, reducing poverty in its multiple dimensions, and paving the way to better living conditions (Sen, 2013).

Considered as a medium for development, instrumental freedoms are rights or opportunities that give individuals the freedom to live as they please. These freedoms may be individual or collective, exercised through public policies that aim to increase substantive human freedoms and human capabilities, involving different types of social bodies and institutions. Each instrumental freedom has its own value, but to strengthen development, they must all be implemented together. Depending on the context, a specific type of freedom may be integral to the fulfillment and the existence of other freedoms (Sen, 2013; Zambam, 2009).

Moreover, Sen (2001) points out that freedom is the path to achieving **capability** wellbeing. Capabilities are the various possible combinations of functionings that reflect the freedom of an individual to access the kind of

life that they desire. Functionings, in turn, are the conditions and activities that individuals value in their lives (Sen, 2001). Adequate nutrition, good health, happiness, self-esteem, and participation in community life are some examples of functionings (Kang, 2011, p. 356).

Table 1 gives an overview of Sen's (2001) five instrumental freedoms: political freedoms, economic facilities, social opportunities, transparency guarantees, and protective security.

Table 1
Particularities of the five instrumental freedoms

Instrumental freedom	Concept
Political freedoms	Opportunities for individuals to choose and scrutinize their governments. Guarantee the freedom of expression to criticize authorities and the existence of a free press. In general terms, these freedoms guarantee civil rights.
Economic facilities	Opportunities oriented to the use of economic resources for consumption, production, and exchange. These freedoms increase access to economic resources and improve the individual's conditions for exchange.
Social opportunities	Opportunities that the social structure offers the individual and which affect their substantive freedoms. These freedoms improve access to healthcare, education and infrastructure, leading to greater inclusion in the community and in the social and political spheres.
Transparency guarantees	Related to the degree of confidence that an individual has in social interactions, in the expectation that these relations are based on mutual trust and sincerity. These freedoms are important mechanisms for preventing corruption, illegal transactions, and financial irresponsibility.
Protective security	A guarantee of social security. Irrespective of the functionality of the economic system, some individuals will always be vulnerable to deprivations. Therefore, the mechanisms of this instrumental freedom denote the institutional responsibility of preventing sections the population from being reduced to conditions of extreme poverty or even inviability.

Source: adapted from Sen (2001).

Strengthening the relationship between the various instrumental freedoms fosters development by: (i) enabling the emergence of opportunities that improve the economic and social conditions of individuals; and (ii) including individuals in the various dimensions of their lives, which helps tackle the multidimensional forms of poverty (Sen, 2001). In view of the above, it is important to note the role of the state in creating the conditions for the enjoyment of instrumental and individual rights.

In particular, in Brazil the state has established various mechanisms and instruments to offer vulnerable population groups **protective security**. Above all, the constitution of Brazil considers youth as an important social category—not just because they represent a large proportion of the Brazil-

ian population, but also because they are more susceptible to the impacts of social inequality. Moreover, this group is recognized as being strategic for the promotion of national development (Brasil, 2013). As such, the goal of eradicating multidimensional poverty among Brazil's youth is an important one.

Youth as a vulnerable social group and their capability to strengthen Brazil's development

A report issued by the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatistica, IBGE) titled *Un análisis de las condiciones de vida de la población brasileña 2016*, provides an overview of Brazilian social indicators and the conditions of its population across a range of important dimensions, taking into account characteristics of work, education, and population density. The section headed "Population Groups" specifically addresses protected social categories under the Brazilian Constitution of 1988 (children, adolescents, youth, and the elderly), which together accounted for more than half of the population in 2015. The Constitution seeks to protect and guarantee the rights of individuals belonging to these groups through actions at the level of the state and society (IBGE, 2016).

The document *Transformando nuestro mundo: la Agenda 2030 para el desarrollo sostenible* emphasizes the multidimensional character of development and poverty in the 21st century. Approved by the UN, it comprises a series of aims and targets across social, environmental, and economic spheres oriented toward the following outcomes: (a) the eradication of poverty in all its forms; (b) the protection of the planet and its natural resources; (c) the promotion of peaceable and inclusive societies; (d) the guarantee of human rights and gender equality (UN, 2015). Analysis of these documents reveals that in both UN documents and the constitutional foundations of Brazil there is a strong and formalized concern for socioeconomically vulnerable groups.

Though Brazil has witnessed an aging population and a decreasing birth rate in recent decades, youth still account for a significant share of the population (IBGE, 2015). Young persons are counted as those between 15 and 29, who in 2015 made up an estimated 25.12% of the population (IBGE, 2015). Because of the size of this population group, it is important to study the deprivations and the vulnerabilities to which young people are often subject.

This analysis is all the more crucial when it is recalled that youth is a life stage in which many changes occur simultaneously. In the transition from adolescence to adulthood, individuals must make countless decisions that gradually shape their future. As Camarano and Mello (2006, p. 14) observe:

> A more balanced vision must consider this stage of life as that composed of complex and heterogeneous experiences, characterized both by vulnerabilities and potentialities. [...] The potentialities acquired by young persons throughout their lives, as well as the opportunities and obstacles they experience at this stage, can influence their passage into adult life, with consequences also for the place they will occupy on the social and economic scale in the future.[5]

Mindful of the importance of youth in the life of individuals, various studies have analyzed and attempted to understand questions related to poverty, education, and work in relation to the population of young persons. Sander (2014) points out that Brazilian young people, who should be treated as social subjects who possess rights and as potential drivers of the country's development, are instead subject to a historical process of social, political, and economic exclusion. In fact, a recently published UNICEF study (UNICEF, 2018) notes that 61% of children and adolescents suffer from some kind of deprivation.

This highlights the importance of the instrumental freedom of **protective security** as a means of achieving development and in support of the functioning of the other freedoms related to youth. Moreover, Amartya Sen stresses the empowerment of vulnerable persons as key to the creation of freedoms—a proposal which, when applied to the case of Brazil's youth, can provide a basis for eradicating the factors that curtail local development, since the marginalization prevailing in this large social group places restrictions on the budget and on other factors that reinforce their social exclusion (Groppo, 2016).

A key demand of young people is better working conditions, since they are the first to lose their jobs during times of crisis, and those with the lowest monthly income. Ribeiro and Neder (2009) argue that among the unemployed, it is young people who face the greatest difficulty in finding work. In the case of the poorest youth, these difficulties are compounded.

However, analysis of the Brazilian job market with reference to data from the National Household Sample Survey (Pesquisa Nacional por Amostra de Domicílios, PNAD; IBGE, 2015) points to significant improvement in the circumstances of this population group. Between 2005 and 2015, the number of young people with monthly income above the minimum wage rose from 32.6% to 43.8%. As to hours worked, 13.7% of young people stopped working more than 44 hours per week (IBGE, 2015; ILO, 2016).

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

An improvement was also recorded on the educational front, so essential for overcoming deprivations: the mean number of years of schooling increased to 7.8 years. However, the country still lags behind its neighbors: its median figure is the lowest in Mercosur (Vieira, Khun, & Marin, 2017; IBGE, 2016).

Considering Amartya Sen's theoretical proposal about instrumental freedoms for overcoming vulnerabilities, capabilities and functionalities, and development and poverty as multidimensional phenomena, there is a need for studies on the incidence of deprivations among the youth population of Brazil. As Groppo (2016) has observed, young people represent extraordinary opportunities for economic, social, and human development.

2. Methodology

Studies that aim to understand the phenomenon of multidimensional poverty explore various aspects that influence an individual's quality of life. In this regard, systemic analyses seek to produce information that is consistent with people's everyday lives and realities. The present study employs the approach proposed by Alkire and Foster (2009), which involves a 12-step method for analyzing multidimensional poverty.

The aim is to assess the incidence of poverty among young people in the different macroregions of Brazil.[6] To this end, the study draws on statistical data available for states in the North macroregion (Amazonas, Roraima, Amapá, Pará, Tocantins, Rondonia, and Acre), the Northeast region (Maranhão, Piauí, Ceará, Río Grande del Norte, Pernambuco, Paraíba, Sergipe, Alagoas, and Bahía), the Southeast region (Minas Gerais, São Paulo, Río de Janeiro, and Espírito Santo), the Central-West region (Mato Grosso, Mato Grosso del Sur, and Goiás), and the South region (Paraná, Río Grande del Sur, and Santa Catarina).

In line with Alkire and Foster's (2009) recommendation, the Multidimensional Poverty Index (MPI) is obtained through 12 operational steps. The methodological stages proposed by these authors are follows:

1: Selection of the unit of analysis: The unit of analysis for the present study is the youth population (individuals between 15 and 29 years of age) living in the five macroregions of Brazil.

2: Selection of the dimensions of poverty: Following bibliographic research (encompassing Vieira *et al.*, 2017; Fahel *et al.*, 2016; and Serra, 2017;

6 Secondary data reflecting the socioeconomic realities of the various states of Brazil can be accessed via the IBGE's Cidades e Estados portal. See https://www.ibge.gov.br/cidades-e-estados.html

among others), it was decided to analyze poverty from the perspective of the following five dimensions:

a) Education and access to knowledge.[7]
b) Housing conditions.[8]
c) Sanitary conditions.[9]
d) Standard of living.[10]

3: Definition of the indicators of analysis: the four abovementioned dimensions are composed of a total of 12 indicators. The dimension of **education and access to knowledge** contains the following indicators*:* (I) conditions of **internet access**; (ii) **level of education** of the individual; and (iii) **literacy**. The dimension of **sanitary conditions** is composed of: (iv) conditions of **access to an adequate water supply**; (v) conditions of **sanitation facilities**; and (vi) conditions of **access to the sewerage network**. The dimension of **housing conditions** is represented by: (vii) conditions of **access to the electricity grid**; (viii) conditions of **access to garbage collection**; and (ix) conditions of **shelter of the dwelling**. Finally, the fourth dimension, **standard of living**, consists of the following indicators: (x) **household income per capita**; (xi) **working hours**; and (xii) **housing density**.

4, 5, 6, 7, and 8. Definition, calculation, and application of the cut-off lines: the cut-off lines are produced at two points in the analysis. First, by assessing the conditions of each indicator, it is possible to determine which of the agents are private. Then, each individual receives a score that varies according to their deprivations in the indicators that comprise the index,

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7 Education and access to knowledge is understood to be fundamental to improving an individual's quality of life. As Sen (2001) argues, lack of access to formal education can raise various obstacles to participation in economic activities. Thus, the greater one's level of knowledge and access to information, the lower the likelihood of remaining in a state of poverty.

8 It is widely agreed that the housing conditions in which one lives is a determining factor for quality of life and well-being. As Vieira *et al.* (2017) observe, deprivation of material goods and of access to basic domestic utilities stand as evidence of the level of poverty an individual experiences.

9 Individuals with access to basic sanitation are less susceptible to diseases caused by lack of hygiene or contact with unhealthy environments (Sen, 2001). At the same time, healthy individuals have better opportunities to access the job market, develop well-being, among others.

10 An individual's capability of accessing material goods is related to their capability of obtaining a financial income and to the work activities in which they engage. As such, it is estimated that monetary income obtained and the work profile assumed influence the deprivations experienced by agents (Vieira *et al.*, 2017). Moreover, precarious labor conditions are a constant issue for young people, who often look to join the job market by accepting whatever the working conditions may be (Muniz & Medeiros, 2015). Finally, the indicator of crowding, calculated in accordance with the criteria of the Ministry of Cities and its definition of housing deficit, characterizes those households with more than three residents per bedroom as deprived (Fundação João Pinheiro [FJP], 2014).

which are calculated based on the weighted sum of the deprivations experienced, as expressed in equation 1. So, for example, in the conditions for the **internet access** indicator, which is shown below, each individual who did not have access receives a score of 1, while other individuals who did have access receive a score of 0. Then, the same procedure is followed for each of the other indicators.

$$c_i = w_i I_1 + w_2 I_2 + \ldots + w_d I_d \quad (1)$$

Where: I_1=1 if the household was deprived in the indicator *i*, and I_1=0 otherwise.

Moreover: w_i Represents the weight attributed to indicator *i*, and its summation $\sum w_i$=1. Next, the second cut-off (called cut-off line *k*) is implemented to establish the minimum number of indicators of deprivation by which an individual is regarded as multidimensionally poor. For this, the sum of the deprivations in a percentage of the weighted indicators is taken into account. In the present study, individuals must present deprivation in four or more of the indicators analyzed[11] to be considered multidimensionally poor. Thus, each individual must have a deprivation score equal to or greater than the cut-off line: $c_i \geq k$. An individual is counted as multidimensionally poor if they are deprived in at least four of the indicators, regardless of what they may be.

The score assigned to individuals with a deprivation score below the poverty cut-off line, even if it differs from zero, will be replaced with "0" so that any existing deprivation is ignored. This measure censors the deprivations of the so-called non-poor, differentiating them from the original deprivation score by way of the notation $c_i(k)$, also called the "censored deprivation score." Thus, when $c_i \geq k$, then $c_i(k) = c_i$; if $c_i < k$, so $c_i(k) = 0$. That is, $c_i(k)$ is the deprivation score for the poor.

Table 2 provides an overview of the dimensions, indicators, and conditions defined to determine the multidimensional poverty of the youth population in the five Brazilian macroregions.

11 The literature indicates that an individual is counted as deprived if their deprivation score is greater than or equal to 1/3 (one-third) of the indicators analyzed (Alkire & Foster, 2009). In the present case, this equates to four indicators (one-third of the total), and is the same criteria as that used to calculate the MPI in *Informe sobre desarrollo humano* of 2010 (Fahel *et al.*, 2016; Serra, 2017). It should also be noted that the same weighting is given to each of the indicators.

Table 2
Dimensions, indicators, and conditions of deprivation based on the Alkire-Foster method

Dimensions	Indicators	*Proxy* for measurement	Deprived if...
Education and access to knowledge	Internet access	The interviewee has access to the internet in their own dwelling	Does not have access to the internet in their own dwelling
	Education level	Interviewee's years of education	Less than eight years of education
	Literacy	Knows how to read and write	Does not know how to read or write
Sanitary conditions	Water supply	There is running water in at least one of the rooms in the interviewee's dwelling	There is no running water in at least one of the rooms in the interviewee's dwelling
	Sanitation facilities	There is a bathroom or toilet in the interviewee's dwelling or property	There is no bathroom or toilet in the interviewee's dwelling or property
	Access to the sewerage system	There is some form of waste outlet from the interviewee's bathroom or toilet	The waste outlet is not connected to the sewerage network
Housing conditions	Access to electricity	There is some form of lighting in the interviewee's dwelling	The lighting in the dwelling is not electrical (grid-, generator-, or solar-powered)
	Garbage collection	Garbage disposal	Garbage is not disposed of through direct or indirect collection
	Conditions of shelter of the dwelling	Primary material in the construction of the outer walls of the dwelling	The primary material used in the construction of the outer walls of the dwelling is not brick or planed timber
Standard of living	Household income per capita	Monthly household income per capita	Monthly household income per capita of less than 140,00 Brazilian reals
	Working hours	Hours habitually worked across all jobs during the reference week for individuals aged 10 or above	Works more than 44 hours per week
	Crowding	Number of rooms used as bedrooms	More than three persons per room

Source: compiled by authors based on bibliographical research.[12]

12 The dimensions and indicators were chosen based on various studies that approach the issue of poverty from a multidimensional perspective, such as: Kerstenetzky, Del Vecchio and Carvalho (2011); Ottonelli (2013); Instituto de Pesquisa Econômica Aplicada (IPEA, 2013); Brites, Marin and Rohenkohl (2015); Fahel *et al.* (2016); Serra (2017); and Vieira *et al.* (2017).

9. Calculation of the incidence of poverty (*H*): Calculation of the percentage of deprived individuals out of the total sample for each value of *k.*: It should be noted that the values of *H* do not take into account the number of deprivations that each individual experiences, creating the need for the other calculations performed later. The value *H* (o *headcount*) is calculated by way of equation 2.

$$H = \frac{q}{n} \tag{2}$$

Where: *q* represents the number of multidimensionally poor individuals, and *n* represents the total number of individuals who make up the sample.

10. Calculation of the average poverty gap (*A*): This calculation represents the average number of deprivations faced by individuals already considered as multidimensionally poor. Equation 3 describes the formula used.

$$A = \frac{\sum_1^n x\, C_i(k)}{q} \tag{3}$$

Where: $c_i(k)$ is the number of deprivations of multidimensionally poor individuals which, as mentioned above, varies between 0 and 1 because of the standardization imposed by the weight of the indicators analyzed; and *q* indicates the number of multidimensionally poor individuals.

11. Adjusted calculation of incidence: This analysis demonstrates the number of deprivations suffered by the multidimensionally poor; that is, it determines the intensity of the poverty observed. Its calculation generates values between 0 and 1 (or between 0% and 100%), given the normalization criteria. It is illustrated by way of equation 4.

$$M_0 = H\, x\, A \tag{4}$$

By substituting equations (2) and (3) in equation 4, the following formula is obtained:

$$M_0 = (\frac{q}{n}) x (\frac{\sum_1^n x\, C_i(k)}{q}) \tag{5}$$

12. Decomposition of the measure: this decomposition can be performed by population group or by dimension. M_0 is broken down by age groups, by gender, by macroregions or by any other desired attribute arising from the level of vulnerability of the individuals selected. The decomposition can also be carried out by dimension, analyzing the contribution of each of them to general poverty.

The application of the Alkire-Foster method provided some key results with important implications. It should be noted that the quality of life and

deprivations experienced by Brazilian young people aged between 15 and 29 living in the country's five macroregions were evaluated. The analysis employed the National Household Sample Survey (PNAD) (IBGE, 2015). In total, the living conditions of 85,388 young Brazilians were assessed.

3. Analysis and discussion of results:

Young people accounted for 25.1% of the Brazilian population in 2015. According to IPEA (2013) population forecasts, Brazil will have 50 million young people by 2023—a total that will never be seen again if current demographic tendencies continue. Although Brazil's youth population contributes significantly to the labor force and to the country's potential for economic development, the vulnerabilities to which they are exposed compound the deprivations they face.

The transformations in the capitalist production system demand certain qualifications that are incompatible with this age group. Indeed, the job market demands high levels of education and professional experience, but these differentials are removed from the realities of many young people. In addition to difficulties finding decent work, the young also face limitations in achieving financial independence (Ribeiro & Neder, 2009).

The context of social inequalities and wealth and income concentration also exposes Brazilian youth to socioeconomic risk and vulnerability. As proof of this, Brazil has one of the highest Gini indices in the world, with a significant proportion of the population excluded from basic rights (Campello *et al*., 2018). Many young people find themselves in situations that are concerning, susceptible to hunger, violence, and other social ills.

Because of all the factors mentioned above, young people were one of the groups that gained legal protection under the Constitution of 1988. Based on the so-called Youth Statute, the state takes actions and passes laws to promote the quality of life and social well-being of young people.

As we have seen, the life stage between 15 to 29 years of age is characterized by many transformations: completing basic education, beginning higher education, entering the job market, taking the first steps in developing a career, and, in some cases, starting a family (Camarano *et al.*, 2006). The manner in which individuals deal with these major transitions is reflected in their well-being and quality of life.

In order to characterize Brazil's youth population, some of the secondary data presented in the population projection tables of IBGE (2013) were reviewed. These data show that youth are 28.28% of the population in the North macroregion; 26.26% in the Central-West; 26.04% in the Northeast; 24.22% in the South; and 23.98% in the Southeast. The statistics attest to

the importance of young people to the country and, given the socioeconomic specificities of the different macroregions, this population group merits special attention from policy-makers and academics.

Based on the implementation of the Alkire-Foster method, preliminary results were estimated, which provided evidence of the level of deprivation among young people in the Brazilian macroregions.[13] The MPI was calculated based on the observation of multiple dimensions and indicators, which refer to functionings corresponding to young people. The results were then analyzed to describe the phenomenon of poverty among this population group. The analytical model is based on the contributions of Sen (2001) and Alkire and Foster (2009) (see Table 3).

Table 3
Results of application of the Alkire/Foster model to Brazilian macroregions

Region	Incidence (*H*)	Intensity (*A*)	MPI (M_0)
North	19.1%	39.7%	7.6%
Northeast	19.7%	40.2%	7.9%
Southeast	3.3%	36.5%	1.2%
South	4.5%	35.4%	1.6%
Central-West	5.5%	35.2%	1.9%
Brazil	11.4%	39.2%	4.5%

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

The calculation of the rate of poverty (*H*) demonstrates the proportion of poor people out of the entire youth population of Brazil. Having examined the twelve indicators of analysis, those individuals who were deprived in four or more were classified as multidimensionally poor. As such, the incidence of poverty extends to 11.4% of the young people who participated in the PNAD (IBGE, 2015). This is an alarming figure, especially when it is extrapolated to the entire youth population. Because the PNAD is probabilistic, it can be inferred that in 2015 there were almost 9 million[14] young people in multidimensional poverty nationwide. With respect to regional specificities, the North and the Northeast were the only macroregions in which the incidence of poverty was above the Brazilian average. In

13 It should be noted that the results reflect the multidimensional poverty of one section of the Brazilian population: the living conditions of 85,388 youths in Brazil were explored. The sample covers a significant number of Brazilian citizens, and is statistically representative with a 95% confidence level and a 1% sampling error (Silva, Gonçalves & Murolo, 2018).

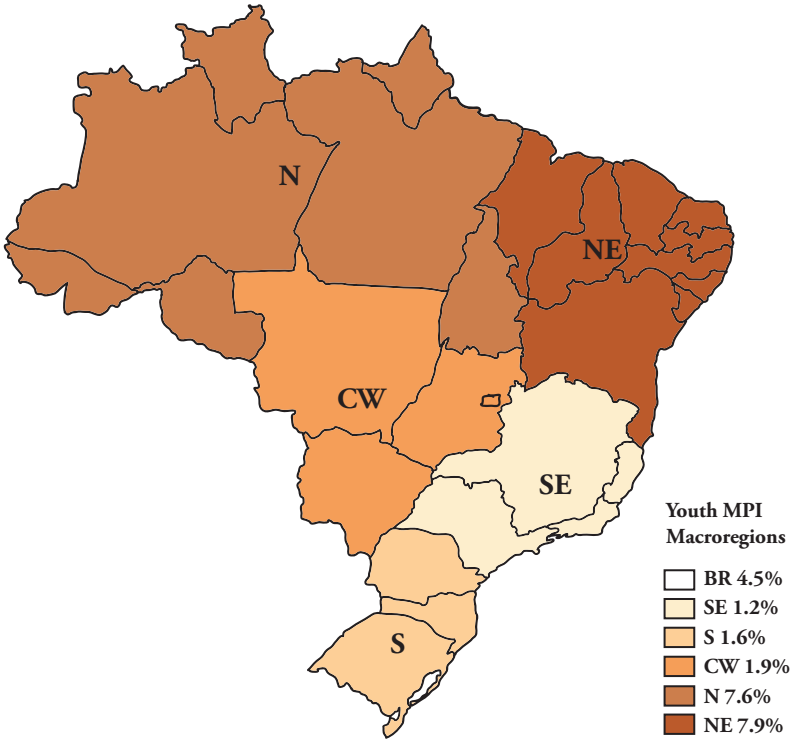
14 The estimated youth population of Brazil in 2015 was 77,771,039. Of that total, 8,865,899 (11.4%) were estimated to be multidimensionally poor.

these regions 19.1% and 19.7% of young people were in multidimensional poverty, respectively.

However, as Alkire and Foster (2009) note, the calculation of *H* is not sensitive to the intensity of poverty faced by individuals already considered to be multidimensionally poor. Therefore, it is necessary to calculate the average poverty gap (*A*), which in the Brazilian case was 39.2%; that is, young people regarded as multidimensionally poor were deprived in 39.2% of the indicators analyzed (approximately five of the 12 indicators considered). Looking at the five Brazilian macroregions, the North and the Northeast, again, were found to have poverty intensity above the Brazilian average. Broadly speaking, it can be argued that young people in the North and Northeast face poverty of greater intensity than the national average.

Also worthy of mention is the analysis of the adjusted index (M_0), also considered as the MPI (see Figure 1). The closer to 100% that the MPI is, the greater the number of deprived young people. For the Brazilian case, in 2015 the MPI was 4.5%; this denotes the proportion of multidimensionally poor individuals adjusted by the intensity of the deprivation they experience.

Figure 1
Multidimensional poverty index (MPI) for Brazilian macroregions (2015)



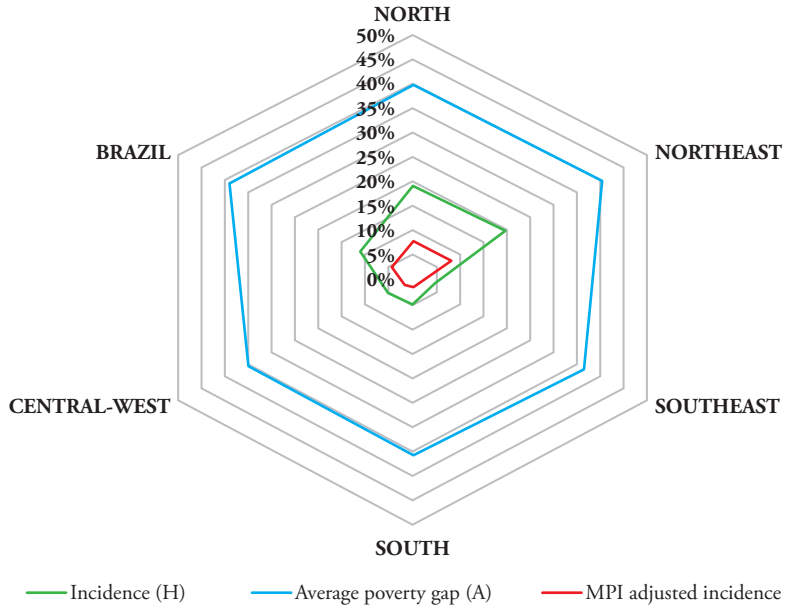
Source: compiled by authors based on PNAD data (IBGE, 2015).

The North and Northeast regions present an MPI above the national average, a result that is corroborated by the study of Fahel *et al*. (2016). The authors present an analysis of MPI without breakdown by age for all Brazilian states and macroregions, by way of the Alkire-Foster method, for the PNADs of 2002, 2007, 2012, and 2013. Their results show that despite the considerable reduction in the MPI over the period, the poverty indices in the North and Northeast regions were always high.

UNICEF (2018) also presents results that corroborate the unequal behavior of the incidence of poverty in Brazil's macroregions for individuals aged 0 to 14. According to *Pobreza en la infancia y en la adolescencia*, 32.8 and 27% of children and adolescents in the North and Northeast regions, respectively, suffer from at least one extreme deprivation; both these percentages are a good deal higher than the national average of 19% (UNICEF, 2018). Thus, even though poverty has decreased over time, the macroregions continue to present unequal results.

Figure 2 presents the estimations of the incidence of poverty (*H*), the average poverty gap (*A*) and the adjusted incidence (M_0 or MPI) for Brazil and its five macroregions.

Figure 2
Incidence (H), average poverty gap (A), and MPI of Brazil and its macroregions



Compiled by authors based on PNAD data (IBGE, 2015).

It should be noted that the average poverty gap (*A*) is distributed uniformly across the macoregions. However, the same is not true for the incidence of poverty, (*H*) or for the MPI. The incidence of poverty is the most pronounced in the Northeast and North macroregions, which demonstrates that a greater proportion of the multidimensionally poor population live in these two areas. It is also evident that the MPI in the North and Northeast regions are higher in proportion to the national average. The figure also shows that the heterogeneity across all Brazilian macroregions is greater for incidence of poverty (*H*) than it is for intensity (*A*).

Having identified the MPI for Brazil and its regions, it is now possible to proceed to a more detailed analysis of the dimensions and indicators that place individuals in conditions of deprivation. This analysis is important as it allows for the proposal of public policies oriented to tackling the problem and lowering these MPI percentages. Table 4 shows the percentage of multidimensionally poor young people deprived in each indicator per

macroregion. In other words, by selecting only individuals with $k \geq 4$, it is possible to observe the indicators in which young people suffered deprivations to the greatest degree in 2015.

Table 4
Percentage of multidimensionally poor young people deprived in each indicator and dimension of analysis

Dimension	Indicator	Macroregion										Brazil	
		North		Northeast		Southeast		South		Central-West			
Education and access to knowledge	Internet access		93.8%		88.8%		90.7%		89.6%		85.2%		90.3%
	Level of education	**55.1%**	64.7%	**54.3%**	63.9%	**53.8%**	64%	**54.1%**	66.4%	**54.1%**	71.1%	**54.3%**	64.3%
	Literacy		6.9%		10.1%		6.7%		6.2%		5.9%		8.4%
Sanitary conditions	Water supply		42.8%		44.1%		16.5%		5.7%		11%		37.6%
	Sanitation facilities	**47.4%**	13.9%	**47.2%**	20.4%	**37%**	5.9%	**33.8%**	3.1%	**36.4%**	2.8%	**45.1%**	15.4%
	Access to the sewerage system		85.6%		77.2%		88.6%		92.5%		95.5%		82.4%
Housing conditions	Access to electricity		7.4%		1.3%		0%		0%		0%		3%
	Garbage collection	**28.1%**	68.5%	**27.5%**	70%	**22.7%**	66%	**16.9%**	43%	**17.5%**	49.4%	**26.2%**	66.7%
	Conditions of shelter of the dwelling		8.5%		11.2%		2.1%		7.8%		3%		9%
Standard of living	Household income per capita		26.6%		34.8%		17.2%		19.7%		10.4%		28.8%
	Working hours	**16.4%**	12.8%	**18.7%**	12.2%	**17.32%**	21%	**19.23%**	29.4%	**17%**	36.2%	**17.8%**	15.3%
	Crowding		9.8%		9.06%		13.78%		8.6%		4.5%		9.41%

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

The results presented in Table 4 show that nationwide, the indicators "internet access," "level of education," "access to the sewerage network," and "garbage collection" exhibit the highest levels of deprivation among individuals considered multidimensionally poor (with an incidence above 30% in each of the four cases). These indicators comprise the dimensions "education and access to knowledge," "sanitary conditions," and "housing conditions," respectively.

The dimension "education and access to knowledge" represents the highest degree of deprivation among multidimensionally poor young people, both regionally and nationally; this is because it is composed of two indicators that are very significant for the composition of the MPI. In sum, 90.3% of young people in multidimensional poverty had no **internet access** in their households in 2015, despite it now being a fundamental tool for communication and access to knowledge. As to the indicator of **level of education**, it is revealed that a considerable share of these individuals (64.3%) studied for less than eight years, equivalent to the minimum number of grades that the Ministry of Education considers appropriate. That is, a significant proportion of Brazilian young people have not even finished primary school. This result coincides with Fahel *et al.* (2016), who find that the years of study completed indicator contributes the most to multidimensional poverty across all Brazilian macroregions (for 2002, 2007, 2012, and 2013).

It is worth noting that the indicators making up the dimension "education and access to knowledge" are highlighted by Sen (2013) in his analysis of multidimensional poverty. The author stresses the importance of education for the expansion of other individual freedoms. Moreover, it can be argued that access to formal education and information technology allow individuals to acquire professional qualifications, scientific knowledge, experience, and habits and attitudes for a better quality of life (Ribeiro & Neder, 2009; Sen, 2013).

The second dimension analyzed, "sanitary conditions," is composed of three indicators, but it is the lack of **access to the sewerage network** that substantially increases the number of deprived individuals. This demonstrates that Brazilians still suffer deprivations in basic, elementary respects. As observed by Albuquerque and Cunha (2012, p. 56): "[...] this situation indicates a serious problem in relation to preventative health, which is highly jeopardized given this scenario. There is a need for greater public investment in the provision of these basic and essential services for the population, such that [they] do not suffer from diseases arising from these vulnerabilities." It is important to alert policymakers to situations such as this, and to point

out effective alternatives that can substantially reduce the level of poverty among Brazil's youth.

The third dimension, "housing conditions," is made up of three indicators, but **garbage collection** presented the highest rate of deprivation. Over half of Brazil's macroregions—the exceptions being the South and Central-West[15]—do not get their garbage collected, either directly or indirectly. In many cases, waste is burned, buried on the property, dumped on the streets, on wasteland, in rivers, lakes or the ocean, or disposed of through other means. It is worth noting that this indicator is of great relevance for the promotion of human development since, as Lamarca and Vettore (2013) show, when it comes to the social determinants of health, adequate garbage collection has a positive influence on reducing disease and pollution.

In line with these results, the IBGE (2016) asserts that in recent decades there has been a reduction in the number of households without direct access to direct or indirect garbage collection nationwide. However, the proportion of individuals who have access to garbage collection services in rural and peripheral areas remains relatively low. Serra (2017, p. 67) notes that non-collection or inadequate disposal of waste poses risks to public health "whether due to direct or indirect contact (through the air, water or ground) or through vectors (mosquitoes, cockroaches, rodents, etc.)."

Deprivations resulting from the living conditions of Brazil's youth population have also been corroborated by the results of the study by Ferreira and Marín (2016). The authors study multidimensional poverty among women by applying the Alkire-Foster method to the Brazilian macroregions for 2001 and 2011. Their results reveal that the indicator giving rise to the most deprivation in 2011, in the dimension **access to basic survival conditions**, is the disposal of domestic waste.

Analyzing the indicators for the "standard of living" dimension, they find **household income per capita** to be the chief source of deprivation among Brazilian youth nationwide. However, when the results are disaggregated by macroregions, the indicator **working hours** proves a major source of deprivation for young people in the Southeast, South, and Central-West. It should be stressed that income is cited in various studies on poverty, from both uni- and multidimensional perspectives. The limited incidence of this deprivation in the present study may be because the cut-off line adopted is relatively low (140,000 reals per capita per month). This demonstrates that

15 It is worth noting that the Federal District, part of the Central-West macroregion, is not reflective of the living conditions of other federal units, but pushes up the average living conditions for the macroregion as a whole.

even with a low cut-off line, income still acts as a determining factor for conditions of deprivation among multidimensionally poor young people in the North and Northeast.

When it comes to **working hours**, the percentages were also small due to the breadth of the age range studied (15 to 29 year olds), bearing in mind that individuals at the lower end of this range generally were not active in the job market in 2015. Therefore, many of the individuals did not suffer deprivation in this indicator.

It should be noted that all of the dimensions analyzed are important for planning and executing public policies aimed at combating social vulnerability at different life stages. Such is their importance that the UN Sustainable Development Goals (SDGs) express a concern for promoting decent income, employment, and living conditions as development priorities for priority areas.

The goals set down in Agenda 2030[16] include the following: (a) SDG 6.1 "By 2030, achieve universal and equitable access to safe and affordable drinking water for all"; (b) SDG 6.2 "By 2030, achieve access to adequate and equitable sanitation and hygiene for all, and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations"; (c) SDG 8.5 "By 2030, achieve full and productive employment and decent work for all women and men, including for young people and people with disabilities, and equal pay for work of equal value"; and (d) SDG 8.6 "By 2030, substantially reduce the proportion of youth not in employment, education or training" (UN, 2015, pp. 22-24).

The concern with good working conditions is also expressed in the report of the International Labour Organization (ILO and IPEA, 2015),[17] whose objective is to achieve access for young people to formal and decent work. In parallel, Sen (2013) thinks that the income variable can strongly affect the level of poverty, but stresses that it should be understood as a means of achieving development and not an end in itself.

Also worth noting is Barros, Carvalho, and Franco (2006), which underlines the importance of analyzing indicators as instruments for understanding the dimensions of poverty, and as a tool for directing public policies,

16 The SDGs are a set of goals and targets aimed at eradicating poverty and driving discussions about food security, health, education, gender equality, inequality reduction, energy, water, and sanitation, among other issues. These goals for 2030 were adopted during the UN Sustainable Development Summit in September 2015.

17 The ILO, alongside the Brazil's Institute of Applied Economic Research (Instituto de Pesquisa Econômica Aplicada, IPEA) published a report titled *Juventud y trabajo informal en Brasil*, which examines informal working situations experienced by young persons and existing proposals for change.

guiding economic agents in the identification of vulnerable individuals and the appropriate development of social programs. In the study by Kageyama and Hoffmann (2006), the authors combine the traditional income-based measurement of poverty with broader aspects related to well-being, including basic elements such as running water, toilet facilities, and electricity. The study concludes that poverty fell between 1992 and 2004, and that there was a reduction in unequal income distribution as well as an improvement in the living standards of the poorest stratum of the population. But despite this perceived progress, in 2015 the level of youth deprivation in these indicators remained significant.

As such, the scope of the dimensions and indicators used in the multidimensional approach, which go far beyond the unidimensional perspective with its restriction to income, are important in explaining poverty. Also important is the suitability of the Alkire-Foster method and its advantages when it comes to identifying the dimensions and indicators in which individuals are deprived, as well as the intensity of the deprivation. Its application in studies in this field contributes to the optimization of public investment in social policies aimed at remedying the main problems of multifaceted poverty.

4. Conclusion

Youth is a critical stage, since any deprivations experienced by a young person can have a considerable impact on the rest of their life. Thus, in order to conduct a diagnostic analysis of the situation in Brazil, this study estimated the incidence of multidimensional poverty among the youth population. Moreover, it identified the main sources of these deprivations in light of regional inequalities in the incidence of this phenomenon. The methodology used was the Alkire-Foster model, with a database drawn from the PNAD (IBGE, 2015).

Four dimensions were analyzed, consisting of a total of twelve indicators. As a result, multidimensional poverty was found to affect 11.4% of the Brazilian youth population, taking into account $k \geq 4$ indicators. Of the different macroregions, the North and Northeast presented proportions of deprivations above the national average: 19.1% and 19.7%, respectively. In the analysis of the MPI, which assesses the proportion of individuals in multidimensional poverty adjusted by the intensity of the deprivation they face, Brazil as a whole has an average of 4.5%, below that of the North (MPI=7.6%) and Northeast (MPI=7.9%) macroregions.

Disaggregating the results by the MPI dimensions of analysis, "education and access to knowledge" and "sanitary conditions" were the two that

contributed most to the prevailing conditions of deprivation in Brazil and in each of the five macroregions considered separately. As to the indicators, it was observed that the conditions of **internet access**, **level of education**, **access to the sewerage network**, and **garbage collection** were the main sources of deprivation faced by Brazilian young people.

It should be pointed out that although poverty affects Brazil's macroregions to different degrees, indicators of deprivation are discernable in each of them. Although young people enjoy better quality of life in some macroregions than in others, overall this population group is susceptible to vulnerabilities and warrants greater attention from policymakers to assess their deprivations and promote actions conducive to their personal and professional development. Ultimately, this will have positive repercussions on levels of economic and social development in Brazil.

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