

The relationship between the human development index, free time and weekly hours worked by the Brazilian population

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Abstract

This study aims to analyze the evolution of the weekly working hours (WWH) of the Brazilian population in relation to its free time and the Human Development Indicator (HDI) from 2008 to 2012. In this study, data were collected from the National Sample Household Survey (NSHS) and from the United Nations Development Programme for Development (PNUD). The data were systematically compared by determining the temporal correlations between the HDI, WWH, housework and Brazilian workers' free time. A gender subgroup was analysed in order to observe different inferences for each of these categories and its relationship with work. The results show that the HDI is directly proportional to the WWH for women and inversely proportional to the WWH for men. It was also found that the number of weekly working hours was higher for women than it was for men. Over the years, women have made a greater contribution to the development of the HDI than men, mainly due to increases in their presence in the labour market, combined with the reduction in gender inequality in society.

Keywords: Brazil, free time, HDI, work; national sample household survey

La relación entre el índice de desarrollo humano, el tiempo libre y las horas semanales trabajadas por la población brasilera

Resumen

Este estudio tiene como objetivo analizar la evolución de las horas semanales de trabajo (WWH) de la población brasilera en relación con su tiempo libre y el Indicador de Desarrollo Humano (HDI), desde el año 2008 hasta el 2012. En este estudio, los datos fueron recolectados de la Muestra Nacional de Hogares Encuesta (NSHS) y del Programa de Desarrollo de las Naciones Unidas para el Desarrollo (PNUD). Los datos se compararon sistemáticamente al determinar las correlaciones temporales entre el HDI, el WWH, el trabajo doméstico y el tiempo libre de los trabajadores brasileños. Se analizó un subgrupo de género para observar cada una de estas categorías y su relación con el trabajo. Los resultados muestran que el HDI es directamente proporcional al WWH para las mujeres e inversamente proporcional al WWH para los hombres. También se encontró que el número de horas de trabajo semanales era más alto para las mujeres que para los hombres. A lo largo de los años, las mujeres han contribuido en mayor medida al desarrollo del

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HDI que los hombres, principalmente debido al aumento de su presencia en el mercado laboral, combinado con la reducción de la desigualdad de género en la sociedad.

Palabras clave: Brasil, tiempo libre, HDI, trabajo, encuesta nacional de hogares

Introduction

The socio-economic development concept is more complete than the economic growth concept because it considers other aspects related to a population's living conditions (Buss, 2000; Jannuzzi, 2014). These aspects can be checked with the Human Development Indicator (HDI), a widely used synthetic indicator of quality of life (QoL). The HDI also considers cultural and social aspects, and, to a lesser degree, economic factors, based on three elements: income, health and education (PNUD, 2014).

The QoL connotation is relatively recent. Although it has a biomedical bias, the World Health Organization (WHO) equates QoL with bodily health, narrowing the concept to physical well-being. The WHO definition does not address the multidimensional and subjective components of QoL, which includes an individual's perception of well-being in relation to his/her position in society, and which is culturally and economically associated with his goals, expectations and concerns (WHOQOL Group, 1998). In addition, there is some agreement that QoL is strongly related to an individual's perception of wellness (Wiggins et al., 2004; Howel, 2012).

Hammell (2004) and Mohit (2014) emphasize that these conditions of well-being are either linked to modern consumerism or to the feeling of "utility", which can elevate self-esteem. Meaning in life (MiL) has also become a central influence that can reflect either a positive or negative QoL (Bernard et al., 2015). For Lima (2002) and Codo, Sorato and Vasques-Menezes (2004), work is directly associated with contemporary subjectivity formation in terms of the current economic system, productivity and consumption. These are the key elements that drive an individual to direct much of his/her time to productive or labour-related activities, so that organizations are more flexible to associate work practices with human resources policies in order to balance and to integrate the work life and social life of the individuals (Haworth and Lewis, 2005).

Subsequently, labour time was reduced to 44 hours a week, a right acquired in the late 20th century with the Federal Constitution of 1988 (Noronha, 2005). It is understood that the struggle for work time reduction, over time, not only in Brazil, but all over the world, increases the possibility of leisure activities, which provides indivi-

duals with personal satisfaction and a better perception of their QoL.

Working time is the time spent for the production of resources. When an individual is not working, his/her time is available for personal use. Available time is individual, unlike free time, which is considered to be collective time. When the individual is not working, his time is whether available or non-working time. This time is individual, different from the free time, which is collective (Marx, 1983).

Available time contributes to a better perception of QoL (Minayo, Hartz and Buss, 2000; Fürstenberg, 1994). Sociological theories, such as Durkheim's theory or the "three Ds", suggest that available time activities do not necessarily mean leisure activities, and these activities are not always separated from work activities. In order to have leisure time a person must be free of daily social, familial and professional obligations.

For Elias and Dunning (1992), the activities performed during leisure time can be classified as private work and family management activities; rest; the provision of biological needs and sociability and mimetic activities. In the free time spectrum, depending on an individual's level of routine activities, these activities include intermediate activities, mainly training and/or self-satisfaction and self-development; and leisure activities. Leisure activities represent a very low level routine. They include sociability and mimetic activities.

In Brazil, the Brazilian Institute of Geography and Statistics (IBGE) published the National Health Research (PNS) study in 2013, which aimed to identify the health and lifestyles of Brazilians. It was found that the perception of health comes not only from the physical sensations of pain and discomfort, but, above all, from the social and psychological consequences of an individual's surroundings. The study also showed a female increase in the stress level, probably due to the double journey performed by women: home and beyond. A global trend for the suppression of this situation was the emergence of the part-time work, which increasingly dominates the jobs in European countries, North America and Japan (Hirata, 2004).

According to the PNS 2013, about 146,3 million people in Brazil are 18 years of age or older. Moreover,

66,1 % of the total population of Brazil self-rated their health as good or very good. The survey also indicated that well-being and lifestyle are related to an individual's the level of education and to the development of the region of Brazil in which he/she resides.

In educational terms, another element of the HDI, the Northeast of Brazil is the region that historically has the highest illiteracy rates, followed by the North. In 2012, 12 % of the Brazilian population aged 25 or older had attained higher levels of education. Illiteracy rates have a direct impact on a country's unemployment rate. In Brazil, over 6 million people are currently unemployed. In comparison, in 2011, 478,000 people were unemployed. However, the income inequity originating from work, as measured by the Gini Index, was 0,496 in 2012 (PNAD, 2014). Overall, 58,7 % of the population has completed elementary school (or the equivalent) and high school (or equivalent) (PNAD 2012, 2013). According to IBGE (2016) boys study more than girls, when it comes to the primary education, or until the 10 years old, however, in recent years, more girls are joining and finishing their studies at the University in comparison to men, as they are becoming more independent.

The reasons why women increase their participation in the labor market is not part of the scope of this article, however, women's absence at home activities has been explained by Oliveira (2012) as a combination of economic and cultural factors such as advancement of industrialization, higher education and fertility rate reduction, which provided women the opportunity to occupy jobs in the production process. Kay (2000) adds that social policies have proposed the inclusion of women in the labor market, however, family policies encourage female workers to see themselves as caregivers within the family unit, that is, although they have individual rights, they feel responsible for their family and home activities, what reduces the leisure and available time in comparison to the spouse.

Bernardo (2001) warns that the accumulation of material goods requires an increase in the labour force and, consequently, a reduction in available time. In this scenario, the present study aims to analyse the evolution of weekly working hour (WWH) in relation to available time and the HDI.

Methods

This study used comparative analysis to analyse the data. The available data from the National Sample of Household Survey (NSHS) and the United Nations Development Programme (PNUD) from 2008 to 2012 were examined and compared. The NSHS discloses

information about the population in the labour market and characteristics, such as age, education and gender. The sample surveys more than 800 municipalities annually to collect this information.

The PNUD is a United Nations development network that is present in over 170 countries, acting in partnership with governments. It organises studies on economic development and analyses the results of the data (PNUD, 2014).

The present comparative analysis relied on the collection of secondary data. As such, it examined the following NSHS variables: hours worked, housework hours spent and free time. The analysis also took the Human Development Indicator (HDI) into consideration. The relationship between the variables was tested to identify the correlation between work and free time in the Brazilian population using the HDI. Important to mention that the variables are stationary.

In parallel with the comparative analysis, temporal correlations were performed between the HDI and weekly working hours (WWH), the HDI and housework and the HDI and free time (differentiated by male and female gender). The NSHS does not provide any information about workers' free time, so, for this study, the workers' free time indicator was calculated using the following formula:

$$\text{Workers' Available Time} = 24 \text{ hours} - (\sum \text{Weekly working hours} + \sum \text{Weekly housework hours})$$

Available time was calculated by subtracting the sum of the total hours worked each week and the hours spent on housework from 24 hours. Thus, available time is the time individuals have for other activities, according to Elias and Dunning (1992).

The data were arranged by year (2008 to 2012) and submitted to the Kolmogorov-Smirnov (KS) normality test, which guided the Pearson's correlation test. Knowing that a coefficient correlation of 0 (zero) means no correlation and a coefficient correlation of 1 (one) indicates a perfect correlation, the default effect described by Field (2009) was used:

- $r = 0$ = No relationship
- $0 < r \leq 0.30$ = Weak relationship
- $0.30 < r \leq 0.70$ = Average relationship
- $0.70 < r \leq 0.90$ = Strong relationship
- $0.90 < r \leq 0.99$ = Very strong relationship
- $r = 1$ = Perfect relationship

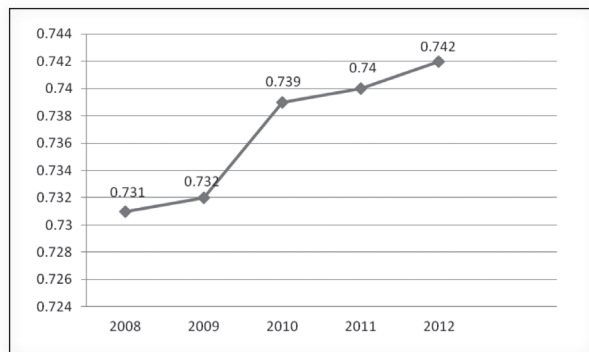
The correlations were then graphically represented by a regression line, adjusted to the least-squares method, which describes the response variable (the dependent variable inserted on the y-axis), in relation to the explanatory variable (independent variable inserted on the x-axis).

GraphPan InStat software was used to test normality. Excel was used for the other tests and for the graphical representations of the Pearson's correlation results, as that software program contains a Parametric Statistics Tests package.

Results and Discussion

The HDI showed a 1,50 % growth between 2008 and 2012 (Figure 1), with an average increase of $0,37 \pm 0,39$ % per year.

Figure 1
Brazilian HDI from 2008 to 2012



Source: Human Development Report Global

By correlating the WWH, housework and free time, it was found that only the WWH showed a significant correlation when differentiated by gender. Table 1 presents the WWH averages with the HDI summarized by gender.

Table 1
HDI and WWH average for male and female 2008 to 2012

Year	HDI	Weekly Working Hours (WWH)		
		General	Men	Female
2008	0,731	39,8	43,1	35,5
2009	0,732	39,8	42,9	35,6
2010	0,739	39,8	42,7	35,9
2011	0,74	39,8	42,5	36,2
2012	0,742	39,6	42,2	36,1

Comparing the annual HDI with the WWH by gender, the average work week appears to be stable for both men and women. For men, the reduction in the average work week was found to be slightly less than one hour (from 43,1 hours in 2008 to 42,2 hours in 2012).

For women, the average hours worked during the week increased from 35.5 hours in 2008 to 36,1 hours in 2012. Table 2 presents the results of the Pearson's correlation test for HDI, WWH and year.

Table 2
Correlation test between HDI, WWH and the year

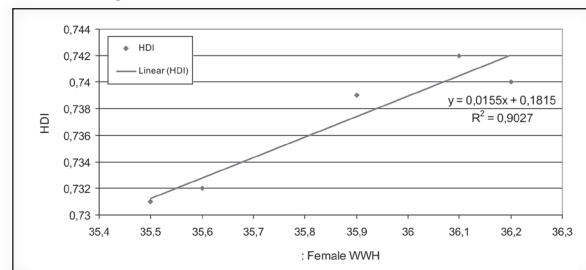
Pearson correlation	Year	WWH		HDI		
		Men	Women			
	General					
Year		1,00				
	General	-0,71	1,00			
WWH	Men	-1,00**	0,77	1,00		
	Women	0,93*	-0,44	-0,90	1,00	
HDI		0,96*	-0,58	-0,94*	0,95*	1,00

*p<0,05; **p<0,001

Overall, a high temporal correlation was found for HDI ($r = -0.96$) and WWH. The HDI for the gender subgroups (male and female) had a high temporal correlation with the WWH; the correlation was reversed in males ($r = -1.00$) and direct in females ($r = 0.93$). While the HDI was found to be directly proportional to the WWH for women, it had an inversely proportional relationship with the WWH for men throughout the evaluation period (2008–2012). Thus, women increased their contribution to the HDI, while men reduced their contribution.

No significant temporal correlation was observed ($p > 0,05$) between the HDI and the total WWH (both genders). However, the HDI also had a high correlation with the WWH subgroups; it was inversely proportional to the male gender ($r = -0.94$) and directly proportional to the female gender ($r = 0.95$), highlighting the relationship between the HDI and WWH for women during the evaluation period (2008–2012). The correlations between the HDI and female WWH were obtained using linear regression and the findings are shown as data scatter plots in Figure 2.

Figure 2
Correlation between the female WWH and the HDI

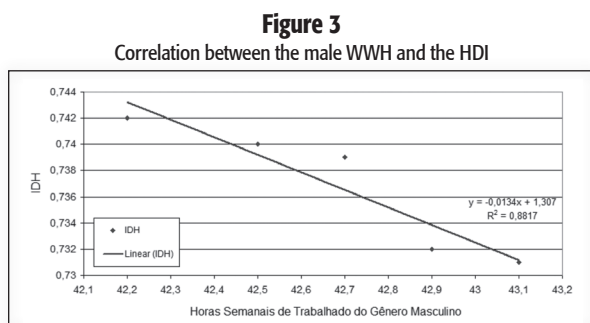


Source: Human Development Report Global

The straight linear regression scatterplot (Figure 2) shows that the growth in female WWH (explanatory vari-

able) represents an explanatory capacity of 90,27 % of the HDI growth (dependent variable). For each WWH, an increase in the HDI growth results in an average increase of 0,0155 points.

The correlations between the HDI and male WWH were obtained using linear regression and the findings are shown as data scatter plots in Figure 3.



Source: Human Development Report Global

It was found that the male WWH has an explanatory capacity of 88.17 % of the HDI growth, showing an inverse relationship between both variables.

From 2008 to 2012, the male WWH decreased an average of 0,18 hours per year, while the female WWH increased an average of 0,22 hours per year. Both variables have a high explanatory capacity, corresponding to 99,18 % and 87,10 % of the WWH, respectively.

Temporally, the HDI is increasing by an average of 0.003 points, with a positive dependence on education, health and income. For the period from 2008 to 2012, the explanatory capacity of the HDI was found to be 91,09 %.

In evaluating the data, the correlation between two HDI variables-income and education - and WWH was taken into consideration. This also indicated that WWH contributed to the development of these two HDI indicators.

Women allocate their free time for other duties, such as housework (Ramous, Ulbanere and Jesus 2014), and their WWH increased over the evaluation time period (2008-2012) thereby reducing their available time.

Between 2008 and 2012, the WWH for males decreased by approximately one hour. Despite this reduction, every week women worked an average of 6.82 hours less than men. However, the average weekly free time was 7,82 % lower for females than for males. This means that women work less than men (in formal employment), but they enjoy less available time because they have

more domestic duties. It is also evident that the HDI is influenced by the increase in female participation in the professional environment. This increase contributes to the family's income.

The IBGE confirms that, in 2012, the average monthly income was R\$1,698.00 for men and R\$1,238.00 for women. Thus, women earned 72,9 % of what men earned; in other words, women earn 27.1 % less income than men. In 2011, women earned 73,7 % of what men earned.

Table 3 shows the average number of hours spent on housework and free time for males and females from 2008 to 2012.

Table 3
Average of hours spent on the housework and the free time for both genders between 2008 and 2012

Year	HDI	Hours spent on Domestic Duties			Free Time		
		Total	Men	Women	Total	Men	Women
2008	0,731	20,4	10	25,4	107,8	114,9	107,1
2009	0,732	21,2	10,5	26,6	107	114,6	105,8
2010	0,739	21,8	10,9	27,2	106,4	114,5	105
2011	0,74	22,4	11,2	27,7	105,8	114,3	104,1
2012	0,742	20,6	10,8	25,4	107,8	115	106,5

Source: Human Development Report Global

In evaluating the relationship between the HDI and time spent on housework, the HDI and the WWH increased but the amount of free time did not. However, no direct correlation was found between HDI and WWH because the HDI also encompasses other variables.

The average weekly hours spent on domestic work (housework) and free time did not show steady growth between 2008 and 2012. For women, the amount of time spent on housework increased from an average of 25.4 hours in 2008 to 26.6 hours in 2009 and from 27.2 hours in 2010 to 27.7 hours in 2011; however, in 2012 it decreased to 25.4 hours.

Based on the data presented in Table 3 it can be stated that, although the HDI increased, the growth was not necessarily tied to the increase in free time because variations in free time were found that did not follow the HDI.

Conclusion

Because available time consists of activities not related to work, and some of these activities are associated with QoL or satisfaction with life and health, this study compared the temporal data of the HDI and the workday

data (average hours worked, hours spent on domestic duties and weekly free time) taken from the PNUD and NSHS. A strong correlation was found between HDI and the WWH based on gender.

From 2008 to 2012, a high temporal correlation was found between the gender subgroups (male and female) and WWH; the correlation was reversed in males ($r = -1.00$) and direct in females ($r = 0.93$). Moreover, while the HDI was found to be directly proportional to female WWH, it was inversely proportional to male WWH.

The high correlation found between the HDI and female WWH confirms the expanding role of women in professional fields. However, the data indicated no significant reduction in the hours that women spent on housework. The amount of time that women work at home is twice as high as the amount of time that men spend engaged in the same activity. Schultz et al. (2014) indicated that this is consistent with the amount of time women spend on housework in the early years of the 21st century, which, on average, is still twice the amount of time that men spend.

Therefore, a distinct situation exists for women who have to combine old and new roles, aiming to balance their duties at work with their personal life and their family life.

Despite being an indicator of QoL, the HDI has no direct relation with free time. A positive correlation was found between the HDI and female WWH from 2008 to 2012. This result indicates that additional discussion is needed on this topic and further studies should be conducted on the subject.

Abbreviations

WWH: Weekly Working Hours; HDI: Human Development Indicator; NSHS: National Sample Household Survey; PNUD: United Nations Development Programme Data for Development; QoL: Quality of Life; MiL: Meaning in Life; IBGE: Brazilian Institute of Geography and Statistics; PNS: National Health Research

Competing Interests

The authors declare that they have no competing interests.

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