Wage differential and disability in Brazil - a productive or discriminatory effect?

Nicole Rennó Castro
Doutoranda em Economia Aplicada – Esalq/USP

Gustavo Carvalho Moreira
Professor do Departamento de Economia – UFSCar/Sorocaba

Rodrigo Peixoto da Silva
Doutorando em Economia Aplicada – Esalq/USP

Abstract
In 2013, 7.32 percent of the Brazilian population, or almost 15 million people, declared that they had some form of disability that limited their mental and/or physical capabilities to some extent. Disabilities affect the labor market both from the supply side and the demand side. Disabilities reduce the labor supply by limiting disabled individuals' transportation options, increasing their transportation costs, and quite simply, reducing their incentive to work. From the labor demand perspective, employers may hesitate to hire the disabled or pay them commensurately with the unimpaired because of a perception that the disability will reduce productivity and increase costs, or their reluctance may be due to indefensible discrimination. Based on empirical evidence, this study sought to answer the following questions: Are people with disabilities paid less in the Brazilian labor market? If so, is this predominantly due to differences in individual socioeconomic characteristics, lower productivity, or is it a case of discrimination? The wage gap analysis was performed by gender and by the severity of the disability's affect on job performance. Using DeLeire's (2001) methodology, the effects of discrimination and productivity were isolated in the analysis. It was found that the wage gap between disabled and unimpaired men is caused by both the discrimination effect and the productivity effect. In the case of women, the observed productivity effect was of greater magnitude than for men, with discrimination being found only among the group of women whose deficiency severely hindered the performance of activities. As an implication for public policies, we reaffirm the importance of the 2015 Brazilian Persons with Disabilities Statute.
Keywords: labor market, health, person with disabilities statute
JEL Classification: I19, J24, J31
Área 13: Economia do Trabalho

Resumo
Em 2013, 7,32% da população brasileira, ou quase 15 milhões de pessoas, declararam possuir alguma deficiência que limita a sua capacidade física e/ou mental. No que tange o mercado de trabalho, a deficiência afeta tanto o lado da oferta quanto da demanda. No caso da oferta, um exemplo disso seria a dificuldade de locomoção, que eleva os custos de transporte e reduz o incentivo ao trabalho. Pela ótica da demanda, os empregadores podem hesitar em contratar deficientes ou pagá-los de modo igualitário aos demais, dada a possibilidade de percepção de que a deficiência reduz a produtividade, aumenta os custos de adaptação do ambiente de trabalho ou, simplesmente, por existir a discriminação para com esses indivíduos. A partir da obtenção de evidências empíricas,

este estudo procurou responder as seguintes questões: pessoas com deficiência auferem menores ganhos no mercado de trabalho brasileiro do que as pessoas sem deficiência? Em caso afirmativo, isso ocorre predominantemente devido às diferenças socioeconômicas individuais, menor produtividade ou discriminação? A análise da diferença salarial foi realizada por gênero e pela gravidade do impacto da deficiência no desempenho do trabalho. Para isolar os efeitos da discriminação e da produtividade, foi utilizada a metodologia proposta por DeLeire (2001). Como resultados, verificou-se que o hiato salarial entre homens deficientes e não deficientes é causado tanto pelo efeito discriminação quanto produtividade. No caso das mulheres, o efeito produtividade foi maior do que para os homens, mas a discriminação foi verificada apenas entre aquelas mulheres que declararam que a deficiência afeta intensamente o desempenho das suas atividades. Como uma implicação para políticas públicas, reafirmamos a importância do Estatuto da Pessoa com Deficiência, sancionado em 2015.
Palavras-chave: mercado de trabalho, saúde, Estatuto da pessoa com deficiência

1. Introduction

Prior to 1970, public policy makers' believed that people with disabilities (PWD) should not work. This belief led to the disabled's exclusion from the job market and the application of public resources to subsidize their maintenance (Blanck, 2001).

The lack of employment opportunities for disabled individuals was addressed by the United Nations in 1981. The first legally binding treaty addressing the rights of the disabled to labor market access was promulgated in 1983 by the United Nations' International Labor Organization's (ILO) Vocational Rehabilitation and Employment Convention No. 159, which was ratified by 70 countries and put into force in 1985 (Lopes 2005; Fonseca, 2006).

Based on the ILO agreement, Brazil adopted the Disabled Hiring Law in Companies (Law No. 8,213 / 1991) as internal policy. This law established that companies with 100 or more employees must to fill 2 to 5 percent of their positions with persons with disabilities. The guarantee of employment access mandated by the Quota Law created other issues, such as equal pay and opportunity for promotion.

The right to equal treatment for PWDs in the labor market is recognized by a number of countries (see American Disabilities Act 1990, Disability Discrimination Act 1995, UK Employment Initiative, 2000; European Union). In contrast, Brazil addressed the problem of employment discrimination against the disabled only in 2015 with the Person with Disabilities Statute (EPD - Law no. 13,416, July 6, 2015). Article 34 of the EPD guarantees that "*persons with disabilities are entitled, on an equal basis with other persons, to just and favorable conditions of work, including equal remuneration for work of equal value.*"

In Brazil, 14.7 million individuals were reported as having at least one disability in 2013, representing 7.32 percent of the population. Of these, almost 13 million have only one deficiency: 8.7 percent have only an intellectual disability; 15.7 percent have only a physical disability; 21.9 percent have only a hearing disability; and 54.7 percent have only a visual disability (National Health Survey – PNS, 2013). Of the total number of working-age Brazilian people with one disability, only 41.4 percent are economically active, whereas this figure is 63.6 percent for the unimpaired members of society. Explanations for this labor market participation discrepancy arise from multiple factors and can be analyzed from the perspective of labor supply and demand.

On the supply side, the lack of necessary facilities and infrastructure can make it more costly for people with disabilities to attend to the demands of employment (Gottlieb, Myhill & Blanck, 2010). The dearth of public and/or private environments set-up for people with disabilities limits access to various goods and services, especially transportation services, putting them at a significant disadvantage. In addition, depending on the type, severity and onset of the disability, this group may have lower levels of qualification and require more flexible jobs to fit their treatment regime (Gottlieb et al., 2010).

On the demand side, many organizations are reluctant to absorb this category of worker (Ribeiro & Carneiro, 2009), possibly due to the perception of lower productivity and the cost of adapting the work environment[1] (Garcia & Maia, 2014; Jones, 2008), or the fear stigmatization by fellow employees, which may lead to inter-office friction (Gottlieb et al., 2010; Jones, 2008). Disability can limit the tasks that can be performed, reduce work productivity and increase the costs of its execution (Gannon & Munley, 2009).

Regarding earnings, a difference between the salaries received by disabled workers and unimpaired workers may result from the disabled workers' limitations, their possible unobservable characteristics, their performance, and as an effect of discrimination.

According to Becker (1957), discrimination can be defined as the wage gap between equally productive individuals. Several studies have found the presence of the discriminatory effect in the wage differential between individuals with and without a disability in developed countries, such as Campolieti (2002) in Canada, Kidd, Sloane & Ferko (2000) and Jones (2006) in the United Kingdom, Acemoglu & Angrist (2001) and DeLeire (2001) in the United States, and Lechner & Vazquez-Alvares (2004) in Germany.

The present research follows this theme but focuses on the Brazilian case. Specifically, we seek to answer the following questions: Are people with disabilities paid less than the unimpaired in the Brazilian labor market? If so, is this predominantly due to differences in average individual socioeconomic characteristics, productive failings, or discrimination? To answer these questions, we estimate earnings equations for disabled and unimpaired workers and decompose the differential using the Heckman-corrected Oaxaca-Blinder technique.

The wage-gap analysis was performed separately by gender and by the severity in which the disability affects activities. Other published studies have found that there are significant wage differences between disabled men and women in the labor market. In addition, wage differences are possibly related to the severity of disability (DeLeire, 2001).

As a main contribution of our work on the Brazilian case, we were able to isolate the effects of discrimination and productivity in the wage gap analysis using DeLeire's (2001) methodology. According to DeLeire (2001), the presence of a disability may directly reduce a person's productivity and explain part of any wage gap between the disabled and the unimpaired; however, when carrying out wage gap analyses, authors generally assume that the entire difference between the disabled workers' wage structure and unimpaired workers' wage structure is due to discrimination. DeLeire's (2001) conjecture was supported during our analysis of literature on wage differentiation in Brazil: no empirical work was found that separated the effect of discrimination against the

[1] Some studies show that the suitability of the work environment for workers with disabilities does not represent significant costs to employers and may well lead to the provision of a suitable environment for clients with disabilities. For more details, see Schartz, Hendricks & Blanck (2006) and Ethos Institute (2002).

disabled and the effect of lowered productivity by the disabled on wage structure differentiation.

Results from our study provide information that policy makers should find useful when allocating resources to further public policy in regards to the disabled. For example, the Quotas Law and the EPD presuppose that disabled individuals are discriminated against in the labor market and therefore require assistance if they are to receive equal treatment with the unimpaired when seeking employment and when being remunerated. On the other hand, Brazil has established the Continuous Cash Benefit Program (BPC) that unconditionally directs income to disabled individuals, tacitly assuming that the disability prohibits gainful, productive employment.

The data used in this study were provided by the 2013 Brazilian National Health Survey (PNS), which is conducted throughout Brazil. The Survey data is the most current available, but the data were gathered prior to implementation of the EPD. At that time, there was no legislation to guarantee the disabled the right to employment on "*an equal basis with other persons, to just and favorable conditions of work, including equal remuneration for work of equal value*" (EPD).

This study is structured as follows: Section 2 presents the materials and methodology employed, addressing the adopted concepts and definitions, the data and sample, and the modeling and empirical design; Section 3 presents and discusses the results; and section 4 presents the final considerations.

2. Methodology

2.1. Concepts and definitions

This study compared two broad groups of individuals: those with disabilities and those without. It is emphasized that the individuals' responses to PNS survey questions determined their group. The broad group of the disabled is comprised of individuals that declared themselves to be impaired intellectually, physically, auditorily, or visually. Individuals that declared that they had more than one disability were excluded from our analysis. Table 1 shows the specific deficiencies that are considered in the disabled group and are delineated according to PNS (2013) classifications.

The two broad groups, disabled and unimpaired, were then subdivided by gender. According to Jones (2008) and Baldwin & Johnson (2000) and Johnson & Favreault (2001), the disability's effect may be different between genders as the impacts of particular limitations may be distinct: men's labor may be more adversely affected by loss of mobility and strength; women's labor may depend more on sensory incapacity and appearance.

The severity of a disability in respect to an individual's job activity is also an important factor that, as noted by Garcia & Maia (2014), should account for the differentiation in wages among the disabled. Therefore, we analyze the effect of a disability on wages separately by grouping disabled individuals according to their disability's self-reported affect on their activities.

Table 1 – Disability description

Disability	Includes individuals who were born or who acquired
Intellectual (below-normal development)	Down Syndrome, Autism, Cerebral Palsy or some other syndrome or developmental disorder
Physical	Permanent paralysis of one side of the body or of the legs and arms (both or only one); amputation or absence of leg, arm, hand or foot; congenital or acquired deformity in one or more limbs; motor disability due to poliomyelitis or childhood paralysis; ostomy, dwarfism, or some other unspecified type of physical disability
Hearing (partial or total loss of hearing)	deafness of two ears, deafness of one ear and reduced hearing of the other, deafness of one ear and normal hearing of the other and hearing reduced in both ears (either birth or acquired throughout life)
Visual (partial or total loss of seeing)	blindness of both or one of the eyes, the other eye being reduced or normal vision, and those with low vision in both eyes or one eye

Source: PNS (2013).

The two gender specific groups of disabled were disaggregated into the following sub-groups for analysis: men with disabilities whose disability greatly limits their activities (Men-greatly); men with disabilities whose disability moderately limits their activities (Men-moderately); men with disabilities whose deficiency limits their activities little (Men-little); men with disabilities whose disabilities do not limit activities (Men-without limitation). The group of disabled women was disaggregated into sub-groups in a manner identical to the disaggregation of the disabled men's group (Women-greatly, Women-moderately, Women-little and Women-without limitation). The nomenclature in parentheses will be used hereafter in the study.

Individuals allocated among the groups were those who worked or interned for at least one hour at some money-earning activity during the week of July 21-27, 2013 (the research reference week). The income obtained by the individual refers to the gross monthly income in Brazilian Reals (Brazilian currency) normally received from the individual's main job. The number of hours that an individual normally worked weekly at that main job was used in the calculation of the gross income per hour of work, a variable of interest in the research.

2.2. Empirical modeling and selected variables

Earnings equations are understood as an attempt to empirically relate worker earnings with the worker's personal characteristics and the work's characteristics (Menezes-Filho, 2002). In Schultz's (1961) and Becker's (1962) pioneering articles on Human Capital Theory the authors posit that an individual's salary can be expressed as a function of their professional qualities represented by years of schooling, training, and experience. In this context, Mincer (1974) proposed an equation that analyzes the influence of education and experience on an individual's salary, and is shown by eq. (1):

$$lnY(s,x) \approx \alpha_0 + \rho_s.s + \beta_0 x - \beta_1 x^2 \quad (1)$$

Equation 1 indicates that the neperian logarithm of earnings (lnY) is linear in years of formal education (s) and linear and quadratic in years of job experience (x), with ρ_s being the constant rate of return from education (Heckman, 2006).

It is important to note that estimating Mincer's equation using ordinary least squares (OLS) leads to the problem of sample selectivity, a problem that may make the OLS estimator inconsistent. A procedure developed by Heckman (1977) has emerged as an alternative to correct selection bias between those who work and those who do not work; this procedure is used in our study.

According to Rezende & Wyllie (2006), this approach uses a two-stage procedure that can be summarized as: i) a *Probit* model is estimated to determine the probability of labor market participation; and from this model, one obtains the inverse Mills ratio (IMR); ii) Using the IMR as an explanatory variable, the earnings equation is estimated by OLS for the sample of occupied persons.

In the first step, a *probit* probability model is used to estimate the likelihood that an individual will participate in the labor market based on the individual's observable characteristics. The probability of individual (*i*) participating in the labor market, $p(Y_i = 1)$, conditional on the values of the exogenous variables contained in x_{ji}, is given by equation (2):

$$p\left(Y_i = 1 \middle| x_{ji}\right) = M(\beta_0 + \beta_1 x_{1i} + \cdots + \beta_k x_{ki}) \quad (2)$$

where M is the cumulative normal distribution function described by equation (3):

$$M(z) = \int_{-\infty}^{z} \delta(z)dz \quad (3)$$

and $\delta(z)$ represents the standard normal density.

The dependent variable, Y_i, is binary and assumes a value of 1 if the individual participated in the economically active population (PEA) during our survey's reference period, or 0 if the individual did not; β_0 is the intercept term; $\beta_j (j = 1,2, \ldots, k)$ are coefficients to be estimated; and $x_{ji} (j = 1,2, \ldots k)$ is the vector composed of *k* explanatory variables, which are the individual's observable characteristics considered in the labor market participation equation. The explanatory variables used for this first model are those usually used in other published studies (Cunha, 2008; Oliveira, 2009; Pinto & Cunha, 2014): level of schooling completed, age, race, domicile setting (urban or rural), control dummy variable for metropolitan regions, geographic region and the individual's role at the domicile. The results from the labor participation equations are available upon request.

Using labor market participation equation estimates, we then obtain the estimate of the IMR (λ), which is defined as the inverse ratio of the probability of participation predicted through equation (2). This variable is added as explanatory in the earnings equation estimate to manage sample selection bias. To control for the complete range of other factors that influence earnings other than those presented in Human Capital Theory (education and work experience), additional independent variables are considered in our earnings equation estimates.

As the dependent variable, we use the neperian logarithm of the monthly wage per hour worked from the main job, *Lnwage*. Table 2 presents the complete description of all variables considered by the study's empirical models.

It is of note that this study also contains two variables not commonly used in standard wage equations. The first of these is comprised of self-reported data regarding the individual's health (health). The health variable is assumed to be related to productivity since health conditions can limit the type or amount of work a person can perform (DeLeire, 2001). The second somewhat nonstandard variable captures the age of disability onset (onset), which is divided into three subsets: individuals born with the disability, those that acquired it in their youth (up to 18 years of age) and those that acquired it as adults (18 years old and over).

Table 2 - Description of the variables used in the empirical model

Variable	Description
Lnwage	Gross salary per hour of work (log)
age	Individual's age
age2	Individual's age squared
basic schooling*	1 if it has the instruction and 0, otherwise (base category)
secondary schooling*	1 if it has the instruction and 0, otherwise
college education*	1 if it has the instruction and 0, otherwise
white	1 if is white or yellow, 0 if is black, brown and indigenous.
urban domicile	1 if resides in urban area and 0, otherwise
metropolitan domicile	1 if resides in metropolitan area and 0, otherwise
agricultural sector	1 if works in the agricultural sector and 0 otherwise (base category)
industrial sector	1 if works in the industrial sector and 0 otherwise
service sector	1 if works in the service sector and 0 otherwise
housekeeper	1 if is a domestic employee and 0 otherwise (base category)
private sector employee	1 if is employed in the private sector and 0 otherwise
public sector employee	1 if is employed in the public sector and 0 otherwise
health-1	1 if self-reported very good health condition and 0 otherwise (base category)
health-2	1 if self-reported good health condition and 0 otherwise
health-3	1 if self-reported regular health condition and 0 otherwise
health-4	1 if self-reported bad health condition and 0 otherwise
health-5	1 if self-reported very bad health condition and 0 otherwise
onset_born	1 for individuals that were born with the disability and 0 otherwise (base category)
onset_young	1 for individuals who acquired the disability prior to their 18th birthday and 0 otherwise
onset_adult	1 for individuals who acquired the disability after their 18th birthday and 0 otherwise
Center-West	1 if lives in the Center-West region and 0 otherwise
South-East	1 if lives in the South-East region and 0 otherwise
South	1 if lives in the South region and 0 otherwise
North-East	1 if lives in the North-East region and 0 otherwise (base category)
North	1 if lives in the North region and 0 otherwise

Source: Prepared by the authors, based on PSN (2013). * Complete, in progress or incomplete.

According to Jones (2008) and Baldwin & Johnson (2001), disability can be non-permanent and can occur at any stage of life. Labor market issues faced by individuals who have been disabled since childhood are distinct from those faced by individuals who became disabled later in life, possibly after entering the labor market. According to Jones

(2008), persons who are disabled during childhood may face discrimination both educationally and upon entry into labor market. Persons who are disabled after ending their education may also face discrimination when entering the workforce or when returning to work after a debilitating illness. Although Jones (2008) affirms that it is rare for cross-section studies to have information on the date of a disability's onset, this information is available in PNS's microdata and was included in our study. The relevance of this control was addressed by Pelkowski & Berger (2004), who found out that the adverse effects of disability often depend on the individual's age when struck by the disability (Jones, 2008).

After estimating the earnings equations, the earnings differential between the groups is evaluated using the decomposition procedure developed by both Oaxaca (1973) and Blinder (1973). This procedure starts by calculating the difference between the two broad groups *Lnwage* (log of hourly wage) using results from the groups' estimated earnings equations. It is important to note that the mean wage of each group is that obtained by a linear forecast taken at the midpoint of the equation regressors (Jann, 2008). This procedure is expressed by equation (4):

$$D = E[lnY_a] - E[lnY_b] = E[X_a'\beta_a + v] - E[X_b'\beta_b + v] = E[X_a]'\beta_a - E[X_b]'\beta_b \quad (4)$$

in which $E(\beta) = \beta$ and $E(v) = 0$. According to Jann (2008), equation (4) can be reorganized according to equation (5), which is called "*threefold*" decomposition:

$$D = [E(X_a) - E(X_b)]'.\beta_b + E(X_b)'.(\beta_a - \beta_b) + [E(X_a) - E(X_b)]'.(\beta_a - \beta_b) \quad (5)$$

According to Jann (2008), this differential can be decomposed into two parts, the "*twofold decomposition*." For this, it is necessary to assume that there exists some vector of non-discriminatory coefficients, β^*, so that equation (5) can be rewritten as shown in equation (6):

$$D = [E(X_a) - E(X_b)]'.\beta^* + E(X_a)'.(\beta_a - \beta^*) + E(X_b)'.(\beta^* - \beta_b) \quad (6)$$

Equation (6) is used in our study. According to this equation, the total differential of the two groups of workers' wages is divided into two components. The first component, or the "explained effect" ($[E(X_a) - E(X_b)]'.\beta^*$), is the part of the differential that is explained by the differences in the two groups' average characteristics (productive and personal attributes and other aspects derived from their labor market entry). The second component, $E(X_a)'.(\beta_a - \beta^*) + E(X_b)'.(\beta^* - \beta_b)$, refers to the part of the differential not explained by these characteristics, the "unexplained effect."

As pointed out by Jann (2008), many published studies have attributed this unexplained part of any wage differential to discrimination in the labor market. This is probably due to difficulties when attempting to decompose the unexplained part of the differential and data constraints regarding the specific job-related limitations caused by the disability. However, the unexplained differential can easily arise due productive heterogeneity rather than discrimination, especially in a case that assesses differences between individuals with and without a disability, given potential limitations in the execution of activities by those with disabilities. It is very important to note that the unexplained wage difference component includes all wage differences caused by unobserved variables.

The possible relevance of discrimination and productive heterogeneity when determining the cause of any wage differential between individuals with and without a disability necessitates the development of a strategy to properly control for these aspects in the differential's estimate. Our study follows a procedure proposed by DeLeire (2001) that uses a group of disabled individuals who self-reported that their productivity was not affected by their impairments, which allowed the separation of discriminatory effects on earnings from productivity unobserved effects on earnings. The PNS microdata used in our study contains self-reported answers to the question "to what extent does disability limit your activities," and the answers to this question made that comparison possible. Assuming that the self-reported data is correct, any unexplained difference between the wages of those who report that their disabilities do not limit their activities and the wages of the unimpaired working at the same job is likely to be due to discrimination rather than to the unobserved physiological effects of disability (DeLeire, 2001).

Self-declaration may lead to some types of bias: the presence of financial incentive programs for disabled persons may cause individuals to overreport their disability (Kerkhofs & Lindeboom, 1999), or because the disabled are often socially stigmatized, a disability may be underreported (Bound, 1989). There is no consensus regarding this issue. In Brazil, the main financial incentive program directed toward disabled persons (BPC) is not based on self-reported criteria.

The procedure used on our study to ascribed wage differences between the disabled and the unimpaired due to discrimination or unobserved productivity consists of making two different comparisons, which is represented schematically in Figure 1. In Comparison I, the two following groups are compared:

- Group 1: Unimpaired individuals
- Group 2: Individuals with disabilities that affect their performance at work a little, moderately, or severely.

According to DeLeire (2001), any unexplained difference between groups 1 and 2 is likely to be due to the effects of both unobserved effect of physical state and discrimination.

The second comparison, Comparison 2, is between groups 1 and 3:

- Group 1: Unimpaired individuals
- Group 3: Individuals with disabilities that do not interfere in performance at work.

Any unexplained difference in wages between individuals from groups 1 and 3 is likely due to discrimination (DeLeire, 2001).

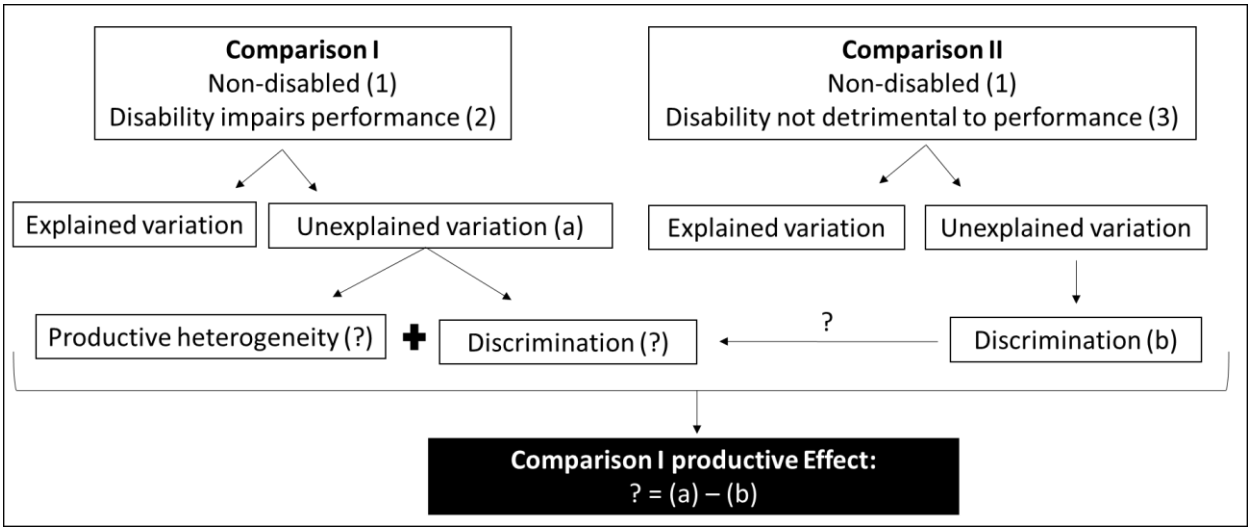

Figure 1. Decomposition of the discriminatory wage effect on the disabled in Brazil's labor market
Source: Prepared by the authors, based on DeLeire (2001).

The disabled whose disability affects their work may demonstrate lower productivity and face discrimination. Considering the results from comparisons I and II, measurement of how much of the unexplained wage difference can be attributed to discrimination and how much can be attributed to unobserved productivity effects caused by the disability becomes essential.

2.3 Data and sample

This study incorporates microdata from the 2013 National Health Survey (PNS) prepared by the Brazilian Institute of Geography and Statistics (IBGE) and contracted to the Ministry of Health. The 2013 PNS survey is the most current available and provided information regarding the health status and lifestyles of 205,546 individuals and 63 thousand households within Brazilian territory. The health status data specified individuals with chronic diseases and disabilities. The survey also includes demographic and socioeconomic statistics.

The PNS sample included 13,569 Brazilians who reported a disability (6.65% of the entire sample). Of these, 1,499 (10.97% of the disabled) were excluded from our analysis because they declared that they had more than one disability. This was done because only one disability is sufficient to identify discrimination, if it exists.

The study considered a sub-sample drawn from PNS data of people between 18 and 60 years of age who do not attend school. Of the 81,802 individuals that made up this sub-sample, 5.99 percent (4.9 thousand individuals) declared themselves to have only one disability, and 45.2 percent of them were economically active (2,240 individuals). Of those disabled, economically active individuals, 64.64 percent are visually impaired, 19.73 percent are hearing impaired, 13.79 percent are otherwise physically disabled and 1.83 percent are intellectually disabled. The remaining individuals in the sub-sample were unimpaired, and 67.9 percent of them were economically active.

Among the disabled, economically active population (EAP) in the study's sub-sample, 54.69 percent are men and 45.31 percent are women. The effect of the sub-sample's disabled EAP's disability on their activity is similar between men and women with 53.6 percent reporting that the disability does not interfere with their economic

activities, 25 percent reporting that the disability impairs the activity only a little, 12.7 percent reporting that the disability moderately affects the activity, and 8.6 percent reporting that the disability greatly disrupts their economic activities.

Table 3 contains main average observable characteristics (and its standard deviations) of the groups being compared: the unimpaired and those whose disability does not interfere, interferes only a little, interferes moderately, and interferes strongly in activities.

The data in Table 3 show that the proportion of individuals who declare a very good health condition is significantly higher for the non-disabled and for the disabled whose disability does not affect their activities than it is for those in the other disabled categories. At the other health extremes, the proportion of individuals who report a poor or very poor health condition is much higher for those whose disability limits their activities to some extent than for those in other categories. For the unimpaired and for those whose disability does not affect activity, the proportion of self-statements from those whose health condition is poor and very poor is similar and lower than for those who have a disability that affects activity.

Regarding the types of disability in the considered sample, visual disability predominates in all subcategories of the disabled. There are also a relatively higher proportion of people with physical disabilities in the categories disability “moderately affects” and disability “greatly affects.”

Regarding education levels, we emphasize that the distribution of individuals among these levels is similar for the unimpaired and for the disabled whose disability does not affect activities. On the other hand, there is greater percentage of individuals with only basic schooling and lower percentage of individuals with college education (completed or in progress) among those with disabilities that limit activities to some extent than among individuals in the “unimpaired” and the disabled “does not affect” categories.

It is also verified that, among the disabled people whose disability does not affect activities, there is a greater proportion of white individuals and individuals with an urban residence when compared with the other groups. Still, this group (disabled people whose disability does not affect activities) contains the largest proportion of people with jobs in the public sector: 24 percent of that group’s individuals are in that employment category. As for geographical aspects, a relatively high percentage of individuals in the disability “does not affect” activities group reside in Brazil’s South region. There are also a relative high percentage of people in the groups with disabilities that moderately or greatly affect their activities living in Brazil’s Northeast region, the country’s most underdeveloped region. Less developed regions usually contain a higher proportion of disabled people because of adverse living conditions that hamper the development of children and the treatment of disabilities and diseases that can generate disabilities.

Table 3 – Descriptive statistics for the broad comparison groups: unimpaired individuals and disabled individuals whose deficiency does not interfere, interferes little, interferes moderately, or interferes greatly in activities.

Variable	Unimpaired		Disabled							
			Does not affect		Affects little		Affects moderately		Greatly affects	
	Mean	S.d.	Mean	S.d.	Mean	S.d.	Mean	S.d.	Mean	S.d.
Lnwage	1.88	0.78	1.98	0.83	1.74	0.82	1.73	0.76	1.60	0.84
health1	0.14	0.35	0.12	0.32	0.07	0.25	0.07	0.26	0.03	0.17
health2	0.64	0.48	0.56	0.50	0.48	0.50	0.39	0.49	0.34	0.47
health3	0.19	0.39	0.29	0.45	0.36	0.48	0.46	0.50	0.47	0.50
health4	0.02	0.13	0.03	0.16	0.08	0.27	0.06	0.23	0.10	0.30
health5	0.00	0.05	0.00	0.04	0.01	0.12	0.03	0.17	0.06	0.24
onset_born	0.00	0.00	0.13	0.34	0.16	0.37	0.27	0.44	0.20	0.40
onset_Young	0.00	0.00	0.23	0.42	0.19	0.40	0.26	0.44	0.31	0.46
onset_Adult	0.00	0.00	0.65	0.48	0.64	0.48	0.47	0.50	0.49	0.50
intellectual	0.00	0.00	0.01	0.08	0.02	0.16	0.04	0.19	0.04	0.20
physical	0.00	0.00	0.08	0.27	0.17	0.37	0.25	0.43	0.27	0.44
hearing	0.00	0.00	0.20	0.40	0.22	0.42	0.18	0.39	0.14	0.35
visual	0.00	0.00	0.72	0.45	0.58	0.49	0.53	0.50	0.55	0.50
gender	0.53	0.50	0.56	0.50	0.55	0.50	0.50	0.50	0.56	0.50
age	35.97	10.83	41.60	11.29	41.09	11.04	40.87	11.16	41.24	11.62
basic schooling*	0.28	0.45	0.28	0.45	0.40	0.49	0.34	0.47	0.31	0.46
secondary schooling*	0.44	0.50	0.41	0.49	0.31	0.46	0.39	0.49	0.36	0.48
college education*	0.21	0.41	0.22	0.41	0.16	0.36	0.18	0.39	0.13	0.34
White	0.40	0.49	0.47	0.50	0.36	0.48	0.41	0.49	0.37	0.48
urban area	0.88	0.32	0.90	0.30	0.80	0.40	0.88	0.33	0.83	0.37
metropolitan area	0.68	0.46	0.65	0.48	0.57	0.49	0.63	0.48	0.52	0.50
Agricultural sector	0.06	0.24	0.06	0.23	0.12	0.32	0.07	0.25	0.11	0.31
Industrial sector	0.18	0.39	0.18	0.38	0.18	0.38	0.19	0.39	0.16	0.36
Service sector	0.68	0.47	0.73	0.45	0.63	0.48	0.63	0.48	0.63	0.48
Housekeeper	0.09	0.28	0.09	0.28	0.12	0.32	0.06	0.24	0.13	0.34
Private sector employee	0.65	0.48	0.64	0.48	0.60	0.49	0.63	0.48	0.59	0.49
Public sector employee	0.18	0.38	0.24	0.43	0.21	0.41	0.20	0.40	0.18	0.38
Midwest	0.13	0.34	0.12	0.32	0.17	0.38	0.12	0.33	0.12	0.32
Southeast	0.26	0.44	0.24	0.43	0.22	0.41	0.19	0.40	0.17	0.38
South	0.12	0.33	0.21	0.41	0.13	0.33	0.16	0.36	0.12	0.33
North East	0.29	0.45	0.24	0.43	0.25	0.43	0.31	0.46	0.37	0.48
North	0.20	0.40	0.19	0.40	0.23	0.42	0.22	0.41	0.22	0.41

* Complete, in progress or incomplete. Source: Original search data.

3. Results and discussion

Table 4 presents the results of Oaxaca-Blinder decomposition for men and Table 6 the results for women. The results shown in Table 4 indicate that the wage differential is much higher for those men whose disability affects their activities moderately or greatly than it is for men in the other disability groups. For the Men-moderately group, the predicted log wage difference compared to the unimpaired is 0.368, approximately a 44.5 percent difference[2]. The predicted hourly wage for this group (Men-moderately) is R$ 4.80, and R$ 6.93 for the unimpaired.

Table 4 - Results of Oaxaca-Blinder decomposition for men

Group x Unimpaired	Men-little (M1)		Men-moderately (M2)		Men-greatly (M3)		Men-without limitation (M4)	
	Coef.	P-v	Coef.	P-v	Coef.	P-v	Coef.	P-v
Prediction_eform* (Nd)	6.929	0.000	6.929	0.000	6.929	0.000	6.929	0.000
Prediction_eform* (W)	6.161	0.000	4.796	0.000	4.694	0.000	7.792	0.000
Prediction_lnwage (Nd)	1.936	0.000	1.936	0.000	1.936	0.000	1.936	0.000
Prediction_lnwage (W)	1.818	0.000	1.568	0.000	1.546	0.000	2.053	0.000
Difference (Nd – W)	0.118	0.052	0.368	0.000	0.389	0.000	-0.117	0.014
Unexplained	0.109	0.083	0.271	0.035	0.147	0.403	0.127	0.071
Explained	0.008	0.917	0.097	0.474	0.242	0.164	-0.245	0.001
- health	0.028	0.000	0.053	0.000	0.052	0.000	0.010	0.048
- other	-0.136	0.040	-0.043	0.728	-0.015	0.929	-0.224	0.002
- educ	0.092	0.001	0.033	0.349	0.135	0.000	0.007	0.722
- domicilie	0.036	0.000	0.021	0.045	0.031	0.028	-0.003	0.491
- sector	0.016	0.047	-0.004	0.597	0.016	0.062	-0.002	0.592
- job	-0.018	0.119	-0.001	0.957	0.003	0.835	-0.014	0.036
- region	-0.009	0.254	0.036	0.017	0.020	0.203	-0.018	0.000

* Predicted wages after re-transform then to their original scale (R$/hour)
Note: health: health2-health5; educ: secondary schooling, college education; domicile: urban area, metropolitan area; sector: Industrial sector, Service sector; job: Private sector employee, Public sector employee; region: Midwest, Southeast, South, North; other: age, age squared, white, Onset_Young, Onset_Adult, mills ratio.

For the Men-greatly disabled group, the predicted log wage difference compared to the unimpaired is 0.389, or approximately a 47.6 percent difference. The predicted hourly wage for the Men-greatly group is R$ 4.70. For the Men-little group, the predicted log wage difference compared to the Unimpaired group is 0.118, approximately a 12.5 percent difference, with a predicted hourly wage of R$ 6.16.

These wage differentials are higher than those found by Garcia & Maia (2014) when studying the wage gap in Brazil. These authors pointed out a differential of 33 percent between employees with a severe disability and unimpaired employees and a differential of 11 percent between employees with functional limitations only and

[2] As Hertz et al. (2008), our wage data information are all in natural logarithms. So, the percentage differences are approximations for the log point differences. According to the authors, differences of 40 log points or less are reasonably close approximations of standard arithmetic percentage differences.

unimpaired employees. Their study did not disaggregate by gender. The 2006 study by Contreras et al. of the wage gap between the disabled and the unimpaired found that the differential was 8.5 percent in Chile and 32 percent in Uruguay. This study was male gender specific. In addition, it did not disaggregate populations by the severity of the disability, which made it difficult to compare their results with our results.

Finally, the predicted mean hourly wage of the Men-without limitation group is R$7.79, 11.1 percent higher than the predicted mean hourly wage of the Unimpaired group.

An analysis of column M4 of Table 4 shows that in 2013 the percentage wage difference was negatively influenced by the "explained effect" (of -24.5 percentage points). That is, if the average observable characteristics of the disabled Men-without work limitation group were equal to those of the Unimpaired group, the first group's average wage per hour of work would fall to R$ 6.10 per hour, a reduction of 1.96 R$/hour, which indicates that observable characteristics are more positive among this disabled group than for the unimpaired. Similarly, if the average observable characteristics of the unimpaired were equal to those of the disabled Men-without limitation group, the salary earned by the unimpaired would increase to R$ 8.62 per hour.

Why, then, is the average wage of the Men-without limitation group not R$ 8.62? Because there is an effect that is not explained by observable characteristics that reduces their salary by 0.83 R$/hour, to a predicted R$ 7.79 per hour. The differential of 0.83 R$/hour is equal to 12.7 percentage points of their wage, which according to the hypotheses adopted in this study is caused by discrimination, since the groups being compared (Men-without limitation and Unimpaired) are equally productive[3].

Assuming that the discrimination effect does not change according to the degree of disability and in order to understand how much of the unexplained wage differentials observed in columns (M1), (M2) and (M3) are due to discrimination and how much are due to unobserved productive heterogeneity, DeLeire (2001) suggests that the unexplained effect should be disaggregated in each comparison because people with both functional and work limitations may be both less productive as a result of their health condition and face discrimination.

These results of this type of disaggregation are shown in Table 5, which presents the summary of the wage differential decomposition among its components: observable average characteristics (including self-declared health-state), discrimination and the unobserved productivity effect.

Table 5 – Decomposition of the wage differential for men (in log difference)

Decomposition (log difference)	Men-little (M1)	Men-moderately (M2)	Men-greatly (M3)	Men-without limitation (M4)
Explained (except health)	-0.02	0.04	0.19	-0.25
Health (effect on Productivity)	0.03	0.05	0.05	0.01
Productivity (unobserved)	-0.02	0.14	0.02	0.00
Discrimination	0.13	0.13	0.13	0.13
Total	0.12	0.37	0.39	-0.12

Note: This Table should be analyzed together with Table 4 to infer about the statistical significance of the effects.

[3] As DeLeire (2001), we reaffirm that it is assumed here that those individuals who have declared that they have functional impairment that does not limit their activities do not have lower productivity as a result of functional impairment.

It can be seen that for the disabled men whose disability greatly affects their activities (M3), a large part of the differential, 49 percent (0.19), is related to the observable characteristics of the group's individuals' other than their self-declared state of health. Table 4 shows that the educational level of those in the disabled Men-greatly group is the main factor in the explained, observable differential (with a relevant and statistically significant impact). This finding is in line with what was expected, as the analysis of descriptive statistics found in Table 3 shows that this group has the lowest percentage of individuals with a college education, even if incomplete.

Again, for the Men-greatly group, 33 percent (0.13) of the differential was related to discrimination, 5.2 percent (0.02) to unobserved effects on productivity, and 13 percent (0.05) to their self-declared state of health. Referring again to Table 3, it can be seen that among all groups, this group has the lowest percentage of individuals declaring themselves to be in a good state of health and the greatest percentage of individuals declaring themselves to be in poor or very poor health. We can summarize the results for the Men-greatly group by stating that the productivity effect (observed and unobserved) represents about 18 percent of this group's differential. It should be emphasized that the unexplained effect as a whole wasn't considered statistically significant for this group.

For the Men-moderately group, the results can be summarized as follows: the productivity effect (observed or unobserved) represents about 54 percent of the differential, discrimination is responsible for 35 percent of the differential, and other observed characteristics are responsible for 12 percent of the differential. For this group, the observed characteristics other than health play a less important role than they did for the Men-greatly group. As for the "Men-little" group, we have estimated that the productivity effect (observed or unobserved) represents about 9 percent of the differential, mainly related to the self-declared state of health, while other observed characteristics have a negative 17 percent effect. These two characteristics combine to have a negative 8 percent effect (which is offset by discrimination).

Table 6 presents the results of Oaxaca-Blinder decomposition for women. The wage differential pattern according to the severity of the disability's effect on activities is not as clear for women as it is for men. And, the Women-little group had a higher wage differential than the same men's group and the Women-moderately and Women-greatly groups had smaller differentials than the corresponding men's groups. This is compatible with findings by Contreras et al. (2006) that the wage differential for women in Chili (6.6%) and Uruguay (15%) is less than for men.

The predicted log wage difference for the Women-little group when compared with unimpaired women was 0.197, a 21.7 percent difference. The predicted hourly wage of the Women-little group was R$ 5.00 and R$ 6.09 for unimpaired women. As for the Women-moderately group, the predicted log wage difference compared to the unimpaired was 0.149, an approximately 16 percent difference, with a predicted hourly wage of R$ 5.25. For the Women-greatly group, the predicted log wage difference compared to the unimpaired was 0.292, a 33.9 percent difference, with a predicted hourly wage of R$ 4.55. No significant difference was found when comparing the Women-without limitation group with unimpaired women.

Table 6 - Results of Oaxaca-Blinder decomposition for women

Group x Unimpaired (Nd)	Women-little (W1)		Women-moderately (W2)		Women-greatly (W3)		Women-without limitation (W4)	
	Coef.	P-v	Coef.	P-v	Coef.	P-v	Coef.	P-v
Prediction_eform (Nd)	6.096	0.000	6.096	0.000	6.096	0.000	6.096	0.000
Prediction_eform (W)	5.007	0.000	5.254	0.000	4.552	0.000	6.296	0.000
Prediction_lnwage (Nd)	1.808	0.000	1.808	0.000	1.808	0.000	1.808	0.000
Prediction_lnwage (W)	1.611	0.000	1.659	0.000	1.515	0.000	1.840	0.000
Difference (Nd – W)	0.197	0.029	0.149	0.057	0.292	0.000	-0.032	0.535
Unexplained	0.002	0.993	0.016	0.884	0.522	0.001	0.086	0.164
Explained	0.195	0.342	0.133	0.241	-0.230	0.131	-0.119	0.102
- health	0.045	0.000	0.050	0.000	0.059	0.000	0.022	0.000
- other	0.004	0.983	0.043	0.669	-0.357	0.013	-0.152	0.016
- educ	0.107	0.000	0.043	0.369	0.009	0.908	0.021	0.382
- domicilie	0.029	0.001	0.010	0.458	0.030	0.083	0.007	0.344
- sector	0.004	0.344	0.004	0.512	0.006	0.333	-0.002	0.054
- job	0.010	0.586	-0.024	0.287	0.016	0.467	0.007	0.566
- region	-0.005	0.677	0.007	0.681	0.007	0.743	-0.022	0.004

Note: health: health2-health5; educ: secondary schooling, college education; domicile: urban area, metropolitan area; sector: Industrial sector, Service sector; job: Private sector employee, Public sector employee; region: Midwest, Southeast, South, North; other: age, age squared, white, Onset_Young, Onset_Adult, mills ratio.

Column W4 of Table 6 shows that the situation is similar to that for men: the percentage difference was negatively influenced by the effect explained by the characteristics (-11.9 percent, but with a P-value of 0.102). Assuming that this effect is significant, if the average observable characteristics of the unimpaired women were equal to those of the Women-without limitation group, the unimpaired women's average predicted wage would increase to R$ 6.8 per hour (a differential of 10.4%). A major reason why the Women-without limitation group's average predicted wage is smaller than that (R$ 6.8) is related to an effect not explained by the observable characteristics: discrimination reduces their wage 8.6 percent.

Interestingly, for the Women-little and Women-moderately groups, the unexplained effect on the wage differential was not significant, with all of these group's differentials being related to some observable characteristic, essentially health status (and education in the "Women-little" case). This finding makes it easy to conclude that for members of these two groups, observable productivity effects (health) represent the wage differential's main determinant.

The Women-greatly group's case is different than that for the other disabled women's groups. In this case, both the effect explained by the observable characteristics (-23.0 percentage points) and the effect not explained by the observable characteristics (52.2 percentage points) are important in determining the differential. Summarily, the Explained effect acts negatively on the differential even though the "health" control variable has the opposite sign. The "other" control variable group, which includes age and age squared, race, onset of disability, and the Mills ratio, had a negative and significant effect. Of the 52.2 percentage points from the Unexplained effect, 9.0 percent are due to

discrimination and the remaining 44 percentage points are assumed to be unobservable productivity effects.

Table 7 presents the summary of the decomposed components of the women's wage differential.

Table 7 – Decomposition of the wage differential for women (log difference)

Decomposition (log difference)	Women-little (M1)	Women-moderately (M2)	Women-greatly (M3)	Women-without limitation (M4)
Explained (except health)	0.15	0.08	-0.29	-0.14
Health (effect on Productivity)	0.04	0.05	0.06	0.02
Productivity (unobserved)	-0.08^{ns}	-0.07^{ns}	0.44	0.00
Discrimination	0.09^{ns}	0.09^{ns}	0.09	0.09^{ns}
Total	0.20	0.15	0.29	-0.03

^{ns}: Not statistically significant.

Note: This Table should be analyzed together with Table 6 to infer about the statistical significance of the effects.

4. Conclusion

This study examined wage gaps between unimpaired workers and disabled workers in the Brazilian labor market by gender and by the disability's effect on activities performance. We sought to determine if they are due to differences in observable average characteristics, discrimination or unobserved productivity affect (or a combination of then). To accomplish this, we performed the Oaxaca-Blinder decomposition following the procedure developed by DeLeire (2001).

The study's main results indicate that disabled men and women who face difficulties in carrying out their activities have lower wages than unimpaired individuals. For men, this differential is associated with both discrimination in the labor market and the disability's negative effect on productivity.

Overall wage differentials for women were found to be smaller than those estimated for men and were mainly due to productivity heterogeneity. The only exception was for the group of disabled women whose activities were severely affected by their disability, who were found to suffer from discrimination, although, to a lesser extent when compared to disabled men whose activities were reported as also being severely affected by their disabilities.

It is important to point out that two assumptions noted by DeLeire (2001) anchored our results. The first is that the severity of the disability is not exactly correlated with the disabled individual's productivity at work. For this reason, our use of self-reported information regarding the extent to which the disability actually affects activities, which makes isolation of the discrimination and productivity effect possible, is important. This disaggregation is usually beyond the capabilities of other wage gap studies due to data limitations. The second assumption is that disabled people with limitations at work (and different degrees of limitation) and disabled people without limitation at work face the same amount of discrimination.

As an implication for public policy, we stress the importance of continued enforcement of the Brazilian Persons with Disabilities Statute (Law n. 13,416, of July 6, 2015) to ensure that individuals with disabilities receive the same remuneration as the unimpaired for work of equal value. In addition, it is not enough that public policies

guarantee participation and equal reward for this group in the labor market, but that they also efficiently allocate available resources to provide the training and qualification needed so that the disabled can develop their full productive potential. We are in agreement with recommendations made by Bordieri & Drehmer (1986) and Parent & Everson (1982) in this regard.

References

Acemoglu, D., & Angrist, J. D. (2001). Consequences of employment protection? The case of the Americans with Disabilities Act. Journal of Political Economy, 109(5), 915-957.

Baldwin, M. L., & Johnson, W. G. (2000). Labor market discrimination against men with disabilities in the year of the ADA. Southern Economic Journal, 548-566.

Becker, G. (1957). The Economics of Discrimination. Chicago: The University of Chicago Press, 2nd edition.

Becker, G. S. (1962). Investment in human capital: A theoretical analysis. Journal of political economy, 70(5, Part 2), 9-49.

Blanck, P. (2001). Civil war pensions and disability. Ohio St. LJ, 62, 109.

Blinder, A. S. (1973). Wage discrimination: reduced form and structural estimates. Journal of Human resources, 436-455.

Bordieri, J. E., & Drehmer, D. E. (1986). Hiring decisions for disabled workers: Looking at the cause. Journal of Applied Social Psychology, 16(3), 197-208.

Bound J. (1989) The health and earnings of rejected disability insurance applicants. The American Economic Review, 79(3), 482-503.

Campolieti, M. (2002). Disability and the labor force participation of older men in Canada. Labour economics, 9(3), 405-432.

Contreras, D. G., Ruiz-Tagle, J., Garcés, P., & Azócar, I. (2006). Socio-economic impact of disability in Latin America: Chile and Uruguay. Santiago, Universidad de Chile, Departemento de Economia.

Cunha, M. S. D. (2008). Os empregados da agricultura brasileira: diferenciais e determinantes salariais. Revista de Economia e Sociologia Rural, 46(3), 597-621.

DeLeire, T. (2001). Changes in wage discrimination against people with disabilities: 1984-93. Journal of Human Resources, 144-158.

Disabled hiring law in Companies. Law n. 8,213, July 24, 1991.

Ethos Institute. (2002). O que as empresas podem fazem pela inclusão das pessoas com deficiência. Instituto Ethos, Empresas e Responsabilidade Social.

Fonseca, R. T. M. D. O trabalho da pessoa com deficiência e a lapidação dos direitos humanos: o direito do trabalho, uma ação afirmativa. 327 f (Doctoral dissertation, Dissertação (Mestrado em Direito). Universidade Federal do Paraná, Curitiba, 2006. Retrieved from: http://dspace. c3sl. ufpr. br/dspace/bitstream/handle/1884/2423).

Gannon, B., & Munley, M. (2009). Age and disability: Explaining the wage differential. Social Science & Medicine, 69(1), 47-55.

Garcia, V. G., & Maia, A. G. (2014). Características da participação das pessoas com deficiência e/ou limitação funcional no mercado de trabalho brasileiro. Revista Brasileira de Estudos de População, 31(2), 395-418.

Gottlieb, A., Myhill, W. N., & Blanck, P. (2010). Employment of people with disabilities. International Encyclopedia of Rehabilitation.

Heckman, J. J. (1977). Sample selection bias as a specification error (with an application to the estimation of labor supply functions).

Heckman, J. J., Lochner, L. J., & Todd, P. E. (2006). Earnings functions, rates of return and treatment effects: The Mincer equation and beyond. Handbook of the Economics of Education, 1, 307-458.

Hertz, T., Winters, P., de la OAP, Q. E., Davis, B., & Zezza, A. (2008). Wage inequality in international perspective: effects of location, sector, and gender. ESA Working Paper 8/08. Rome, Italy: Food and Agriculture Organization of the United Nations, Agricultural and Development Economics Division (ESA). Available at: ftp://ftp.fao. org/docrep/fao/011/ak230e/ak230e00.pdf.

Jann, B. (2008). The Blinder-Oaxaca decomposition for linear regression models. The Stata Journal, 8(4), 453-479.

Johnson, R. W., & Favreault, M. (2001). Retiring together or working alone: The impact of spousal employment and disability on retirement decisions CRR Working Paper No. 2001-01.

Jones, M. K. (2006). Is there employment discrimination against the disabled? Economics Letters, 92(1), 32-37.

Jones, M. K. (2008). Disability and the labour market: a review of the empirical evidence. Journal of Economic Studies, 35(5), 405-424.

Kerkhofs, M., Lindeboom, M., & Theeuwes, J. (1999). Retirement, financial incentives and health. Labour Economics, 6(2), 203-227.

Kidd, M. P., Sloane, P. J., & Ferko, I. (2000). Disability and the labour market: an analysis of British males. Journal of health economics, 19(6), 961-981.

Lechner, M.; Vazquez-Alvares, R. (2004). The effect of disability on labour market outcomes in Germany: Evidence from Matching, IZA Discussion Paper No. 967; University St. Gallen, Department of Economics Discussion Paper No. 2003-20.

Lopes, G. G. V. (2005). A inserção do portador de deficiência no mercado de trabalho: a efetividade das leis brasileiras. LTr.

Menezes-Filho, N. (2002). Equações de rendimentos: questões metodológicas. Estrutura salarial: aspectos conceituais e novos resultados para o Brasil. Rio de Janeiro: IPEA.

Mincer, J. (1974). Schooling, Experience, and Earnings. Human Behavior & Social Institutions No. 2.

National Health Survey - PNS. (2013). Instituto Brasileiro de Geografia e Estatística. Avaliable in: <http://www.ibge.gov.br/home/estatistica/populacao/pns/2013/>

Oaxaca, R. (1973). Male-Female wage differentials in urban labor markets. International Economic Review 14(3): 693-709.

Oliveira, F. D. (2009). Ocupação, emprego e remuneração na cana-de-açúcar e em outras atividades agropecuárias no Brasil, de 1992 a 2007. 2009. 167 f (Doctoral dissertation, Dissertação (Mestrado em Economia Aplicada) – Escola Superior de Agricultura Luiz de Queiroz, Universidade de São Paulo, Piracicaba).

Parent, W. S., & Everson, J. M. (1986). Competencies of disabled workers in industry: A review of business literature. Journal of Rehabilitation, 52(4), 16.

Person with Disabilities Statute. Law no. 13,416, July 6, 2015.

Pelkowski, J. M. and Berger, M. C. (2004) The impact of health on employment, wages and hours worked over the life cycle, The Quarterly Review of Economics and Finance, 44, 102-121.

Pinto, M. A. N., & da Cunha, M. S. (2015). Emprego e diferenciais de rendimentos no setor agrícola brasileiro: uma análise desagregada por subsetor. Revista de Economia e Agronegócio–REA, 12(1, 2, 3).

Resende, M., & Wyllie, R. (2006). Retornos para educação no Brasil: evidências empíricas adicionais. Economia Aplicada, 10(3), 349-365.

Ribeiro, M. A., & Carneiro, R. (2009). A inclusão indesejada: as empresas brasileiras face à lei de cotas para pessoas com deficiência no mercado de trabalho. Organizações & Sociedade, 16(50).

Schartz, H. A.; Hendricks, D. J.; Blanck, P. (2006) Workplace accommodations: Evidence based outcomes. Work, 27 (4), 345-354.

Schultz, T. W. (1961). Investment in human capital. The American economic review, 51(1), 1-17.