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Abstract

Several countries had an increase in female labor participation during the twentieth century. Even so, few of them can be proud of the conditions these women faced in it. This paper analyzes the occupational distribution by gender from 1978 to 2007 in Brazil. It shows that women are entering traditional male occupations to a certain extent, but they retain traditionally female occupations almost at the same level of occupation as they did 30 years ago. Also, we provide a regression analysis with an Oaxaca decomposition that shows the decreasing gender wage gap, but its persistent value in the last decade.

Resumo

Muitos países apresentaram aumento nos índices de participação das mulheres no mercado de trabalho no século vinte. Entretanto, poucos deles podem se orgulhar das condições de trabalho destas mulheres no mesmo. Este artigo estuda a distribuição ocupacional de ambos os gêneros de 1978 a 2007 no Brasil. Ele mostra que as mulheres entraram em algumas ocupações tradicionalmente masculinas, mas retêm alta participação nas ocupações femininas da mesma forma que há 30 anos atrás. Adicionalmente, a análise econométrica através da decomposição de Oaxaca mostra que a diferença salarial entre os gêneros diminuiu, mas é persistentemente significativa também na última década.

Keywords: wage differentials, discrimination, and women labor market.
Palavras-chave: diferenciais de salário, discriminação, mercado de trabalho feminino

JEL Codes: J24, J31, J71.

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1. Introduction

Virtually all countries showed an increase in female labor participation during the twentieth century. Even so, few of them can be proud of the conditions these women faced in dealing with family responsibilities and the labor market. On the one hand, labor specialization within families continues to be biased by gender even when women engage in labor market activities. Women are engaged in the labor market, but they have to be available to comply with their *family responsibilities* of housework, childcare and other activities dependent on them (Hersch & Stratton, 1994; Álvarez & Miles, 2006; Lundberg, 2008; Madalozzo, Martins, & Shiratori, 2008; Gupta & Ash, 2008). On the other hand, women continue to receive lower wages than men, even when controlling for personal characteristics and job attributes (Blau & Kahn, 1997; Bertrand & Hallock, 2001; Albrecht, Björklund, & Vroman, 2003; Bayard, Hellerstein, & Neumark, 2003; Bucheli & Sanroman, 2005; Galarza, Medina, & Díaz, 2006; Madalozzo & Martins, 2007; Olivetti & Petrolongo, 2008). There is no consensus among specialists whether the former causes the latter or vice versa. However, the majority of studies came to the same result that some intrinsic gender features have significant influence on these outcomes of lower wage and second shift.

One possibility is that career interruptions that women experience during their productive life[1] made them less productive for the labor market and, therefore, available to work for lower wage rates (Deloach & Hoffman, 2002; Hersch and Stratton, 2002; Moe, 2003; Blau, Ferber,& Winkler, 2006; Bryan & Sanz, 2007). Another option is that women's wages are lower because they account for benefits that are available only to women, for example, maternity leave (Waldfogel, 1998; Edwards, 2006; Bergmann, 2008). As a final point, another possibility is that women choose to work in occupations and activities that pay lower remuneration than those chosen by men (Easterlin, 1995; Macpherson & Hirsch, 1995; Miller, 2009). Either one of these possibilities may impact – or be impacted by – the gender division of work by making it less costly to the household for women to spend more hours at home instead of men; if both spouses are equally productive to the market, but the husband receives higher remuneration for his work than his wife, he has a comparative advantage in dedicating more time and effort to the market than her (Ferber, 2003).

Our focus in this study is to analyze female labor participation in Brazil since the 1970s. Brazil is a highly unequal country in several aspects. It has one of the worst Gini indexes in the world, 0.567, being the 10th worst income distribution of the world in 2007.

[1] Labor intermittency caused by marriage, childbirth or other family need that she helped to solve.

Concerning gender differences, Brazil ranked 74th – of 127 countries – in the 2007 World Economic Forum's Gender Gap index, with a score of 0.664[2].

Female labor participation in Brazil increased substantially during the second half of the twentieth century, as can be seen in Figure 1. In 1950, roughly 14 percent of females participated in the labor market. By 1980, this number had almost doubled to 27 percent. The 1980s was the decade that witnessed the biggest inclusion of women in the labor market; and, by 1992, 47 percent of women were engaged in some economic activity or were seeking work. Since them, female inclusion in the labor market has slowly continued to grow. In 2007, 52.4 percent of women were economically active. Nevertheless, women's working conditions in the labor market or within their households remained inequitable.

Other studies have analyzed labor market conditions for women in Brazil. Bruschini (1989, 1998) reports the trends for the female labor market regarding insertion and intermittency. The present research continues these analyses into the new century. In addition, we use econometric resources to evaluate both female entries into industry and occupations as well as the comparison of female and male wages, given their characteristics. Giuberti and Menezes-Filho (2005) used the same methodology to compare earning differentials between men and women for Brazil and the United States; however, their approach assumed the percentage of the earning gap was caused by individual characteristics and the percentage explained by discrimination. Complementing their work, we increased the period analyzed and emphasized the occupation choice on the wages' profile. Our analyses target the average difference in labor market earnings for men and women for the period 1978 to 2007.

This paper is organized as follows: in the next section we describe Brazilian labor characteristics, focusing on activities and gender differentials. Section 3 explains the empirical model used to analyze the gender gap in remuneration and the impact of occupational differentials on it. The results are presented in Section 4 and Section 5 offers conclusions.

2. Brazilian labor market: are there gender differences?

In this section we describe Brazilian labor markets and highlight the differences and similarities between genders with regard to it. Before that it is necessary to explain some peculiarities of the Brazilian labor market. First, it is significantly regulated. Since the 1930s,

[2] Where one represents complete equal treatment between genders and zero total inequality. Gender gap index considers four dimensions: economic participation and opportunity, educational attainment, health and survival, and political empowerment.

with the implementation of the first laws concerning employment in Brazil, there have been an increased number of restrictions and fees employers must pay to be able to hire individuals. The constitution of 1988 aggravated this problem. Second, women overcame specific rights to maternity leave. Until 1988, all female workers had the right to fully paid maternity leave of 90 days. The new constitution increased this right to 120 days. In 2007, a new federal legislation was passed to make possible the World Health Organization's recommendation to breastfeed babies for 6 months. By this law, female workers may opt to take 6 months of maternity leave, also fully paid by the employer[3]. These excessive regulations on the labor market are the concern of many researchers who question its validity to guarantee workers' rights or move them to informal jobs, where they will have no rights at all.

All our analysis used the microdata from PNAD, National Research of Sampled Households (*Pesquisa Nacional de Amostra por Domicílios*). PNAD is an annual research study conducted by the Brazilian Bureau of Statistics, IBGE. It takes a representative sample of Brazilian households and studies, among other aspects of the population, labor, education and health. It contains data at an individual level for the dwellings interviewed. Since 2004, PNAD has investigated data for all national territory[4]. With the purpose of analyzing the past and current trends of employment, we used data from four different decades: 1978, 1988, 1998, and 2007, the most recent data released by IBGE. Questionnaires were modified during this period; however, we made some concatenations in order to make them comparable.

One common way to measure distribution of workers among occupations is the Duncan index. It measures the dissimilarity of distribution of the groups among professions using the half distance of the absolute sum of percentage participation of men and women at each occupation (Kaufman & Hotchkiss, 2003). The Duncan index is calculated using the following equation:

$$\text{Duncan index} = \left(\frac{1}{2}\right)\sum_{j=1}^{N}\left|F_j - M_j\right|$$

where F_j stands for the percentage of females working at occupation j and M_j stands for the percentage of males working at occupation j.

[3] Up to a ceiling of 12 thousand *reais*, maternity leave is paid by the employer who is reimbursed by the government in taxes. This is a very high ceiling. Less than 3 percent of female workers earn more than this value monthly.

[4] Until then, 1.9 percent of the Brazilian population was not included in the sample because they lived in areas not researched. However, the analysis contains weights that allow the comparison to be maintained from previous years.

One way to read the Duncan index is the percentage of females that have to change their occupations in order to have a perfect distribution by gender in each occupation. Therefore, if the Duncan index is close to zero, we conclude that there is low segregation by gender. However, the higher the Duncan index – and 1 is its maximum value – the larger the separation. The Duncan index for Brazilian occupations was 0.493 in1978 and fell to 0.383 in 2007[5]. This means that the different proportion of men and women among occupations is being destroyed. The gradual change in these numbers is to be expected, as a certain amount of time is necessary for the gender profile to be modified for each occupation.

Table 1 shows this information with more specific data[6]. This table presents female distribution among different occupation categories. For each year, we divided the occupations into traditionally male or traditionally female. It can be observed that the majority of occupations maintain the trend of being male vacancies (for instance, carpenters, mechanics, drivers, etc.), while others maintain the tendency of being female occupations (in this case, nurses, librarians, schoolteachers are the better examples). However, some changes became visible. While in 1978 only 4.94 percent of engineers were women, in 2007 more than 10 percent of engineers were female. It is still a small number of individuals; however, it sets a change of pattern. Other examples of traditionally male occupations that are being more occupied by women are insurance agents, police and detectives, and managers and administrators.

On the other side, traditionally female occupations rarely present this change. Two possibilities explain this. The first is that men resist engaging in 'female' activities. This would reflect gender preferences for certain activities and dislike for others. The other alternative is that society resists having men in these occupations. For example, male nurses may be less required than female nurses. A man who chooses to become a nurse may be viewed as a 'failed doctor' more easily than would a woman[7]. This second option is commonly known as consumer prejudice (Patterson & Engelberg, 1978).

These differentials on occupations and industry choices may be one of the determinants of remuneration discrepancy between genders. In order to better control this

[5] For the purpose of comparison, the United States had a 0.414 Duncan index in 2005 (Chakravarty & Silber, 2007).
[6] This table was inspired by Table 8.3, in Kaufman and Hotchkiss (2003, p.425).
[7] Anecdotal evidence of this is the Hollywood hit movie 'Meet the Parents', where the parents of the fiancée avoid saying that their future son-in-law is a nurse.

effect, Table 2 provides the individuals' hourly payment for economic occupation with gender[8] for 1978 and 2007. Table 3 does the same for economic sector and gender.

Using the same categories analyzed in Table 1, it can be seen for most that men have bigger salaries than women. In 1978, for only two occupations, drivers and librarians, did females have a higher average salary than males. For another 16 occupations, men received higher remuneration than women. In 2007, there is a slightly different view: in 12 occupations, men have bigger wages than women and, for three others women earn better wages than men (auto mechanics, drivers, and police and detectives). With no controls for education and industry – which are looked at next - it appears that a long time passed with too few changes happening with regard to gender remuneration differences.

Concerning the industry sector, Table 3 shows that, usually, men used to receive higher wages than women. However, in one activity we have a positive and significant impact on female salaries: construction. This is also one of the activities with lower female engagement. One possible explanation for this premium on female wages is individual selection. In order to participate in this industry, women have to be so different from the average that they receive higher wages than men. Analyzing the education distribution among industries, it can be seen that in the construction industry women have a higher education than men. In 1978, almost 60 percent of females in the construction industry had 9 or more years of education (completed primary level of education), while less than 8 percent of males in this industry had this level of education. In 2007, 68 percent of women in this industry had more than 9 years of education, while 21 percent of men were in the same condition.

This question raises the importance of analyzing the degree of education. Comparing 1978 and 2007 data, we can see some different trends for genders in Table 4. In 1978, men with a low level of education were concentrated in the agribusiness sector, with women with no education being in the same sector, but those who had a small amount of education – 1 to 4 – had migrated to services. When men had from 5 to 11 years of education, they left the agribusiness and moved to transformation industry, while women were basically in services and the social sector. For both genders having more than 11 years of education, there is a higher concentration in the social sector. The picture in 2007 is a little different. Men with a low education continue to concentrate on agribusiness (until 4 years of education), and women on services. However, after finishing the basic level of education, i.e. 4 years, men were employed in commerce. Women, for their part, continue to be concentrated in services

[8] Here we do not control for hours of work or qualification (education degree, for example). These additional controls and others will be the focus of the next sections, with the regression model.

until completing the fundamental level of education, i.e. 8 years, and after that they compose a larger fraction of commerce.

3. Econometric model to calculate discrimination between genders

The previous analysis illustrates that male and female workers have different allocations and returns on the labor market in Brazil. There follows an econometric analysis in order to control distinct influences on individual remuneration. Using this procedure, we will also be able to measure the impact of occupational choices and individual characteristics on the hourly wage.

The basic model follows Mincer (1995). The mincerian equation relates the hourly wage with individual demographics and job definitions, as shown by equation (1).

$$\ln w_i = \alpha + \sum_{j=1}^{k} \beta_j X_i + \sum_{s=1}^{m} \gamma_s Z_i + \varepsilon_i \qquad (1)$$

where w_i is the hourly wage for individual i, X_i are the demographics for individual i. Z_i represents dummy variables for activities and occupations for each individual[9].

By demographics we mean individual age and its squared value – to account for the concavity on remuneration – residence region[10] and education dummies[11]. Z_i is composed both by occupation and by industry dummies. For all years, we used the classification of them on three-digit dummies.

Also, we were able to test the influence of occupational distinction of authority on wages. Budig and England (2001) created a dummy variable for authority. This variable was composed using code 1 for all occupations that have the words 'management', 'supervisor' or 'foreman' in their description. As dependent variable they used the natural log of hourly wage in the respondent's current job in this study about the wage penalty of motherhood. They find that mothers are less likely to be in jobs involving authority; however, it does not seem to have an effect on the estimated motherhood penalty. In our work 'authority' was included as a variable of job characteristic. This variable is a dummy coded 1 for occupational categories with titles containing the words 'supervisor', 'manager' or 'director'. We used this additional variable only for the 2007 data which is more complete. Also, for 2007, we included race dummies[12] and tenure on the job[13] in order to have a more complete set of controls[14].

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[9] Excluded category is Agricultural Business.
[10] Excluded category is Southeast, the richest Brazilian region.
[11] Excluded category 'No education'. Other categories are: basic (1 to 4 years), fundamental (5 to 8 years), high school (9 to 11 years) and college or more (12 or more years).
[12] Excluded category is White; other categories are Black, *Mulato*, Asiatic and Native.

Since the main purpose of this study is to analyze female labor characteristics, we estimated equation (1) separately for men and women using ordinary least squares. We did not use a Heckman correction for the female equation because we are concerned only with working individuals. These regressions result in two different outcomes posed as equations (2) and (3).

$$\ln w_i^F = \hat{\alpha}^F + \sum_{j=1}^{k} \hat{\beta}_j^F X_i^F + \sum_{s=1}^{m} \hat{\gamma}_s^F Z_i^F + \varepsilon_i \quad (2)$$

$$\ln w_i^M = \hat{\alpha}^M + \sum_{j=1}^{k} \hat{\beta}_j^M X_i^M + \sum_{s=1}^{m} \hat{\gamma}_s^M Z_i^M + \varepsilon_i \quad (3)$$

where equation (2) uses only female data to estimate the coefficients, and equation (3) uses the male data to this end. These features allow us use the Oaxaca (1973) method to estimate the male–female differences not explained by their own characteristics. Using the estimated coefficients for female and male individuals, we calculate the hourly wage one individual would have if he or she was a male and, the alternative possibility, if he or she was a female. We use these computations to determine the wage differential that is not explained by observable characteristics, as shown in equation (4).

$$\hat{D}_i = \sum_j \hat{\beta}_j^M X_i - \sum_j \hat{\beta}_j^F X_i \quad (4)$$

We compare the estimated value of equation (4) for each individual and use the population average for this variable as the estimation of the non-explained portion of gender gap across the years. The bigger the value of the difference for the sample, the bigger the gender discrimination in the sample[15]. In the next section, we present the results.

4. And the difference between genders is…

We estimate equations (2) and (3) for the different samples: 1978, 1988, 1998 and 2007 separately. As mentioned earlier, for 2007, because of the availability of additional

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[13] Excluded category is 'less than 6 months'; other categories are '6 months to 1 year', '1 to 2 years', '2 to 5 years' and 'more then 5 years'.

[14] Since 1976, IBGE changed the PNAD questionnaires many times. We do not have all the basic variables for all years. Therefore, we estimate a more complete equation only for 2007, but kept the 'basic' regression for all years in order to be able to compare results.

[15] *D* statistic can either be an overestimation or underestimation of discrimination. Not all the differences verified on variable *D* can be considered discrimination *per se*. As the microdata available are not complete for the individual characteristics, we only can affirm that we control for 'observable' characteristics of each individual and the *D* statistic represents the effect of 'non-observable' characteristics neither to the researcher nor the labor contractors. Therefore, remaining differences would be some sort of discrimination by gender. On the other hand, *D* may underestimate the discrimination because we control for occupation, for example, and, if there is non-market discrimination that induces women to opt for easier and worse remunerated occupations, we would not see it on the final estimation. See Oaxaca, 1973.

variables, we included extra controls of race, tenure and authority. Our baseline regression includes demographics and industry sector. The final model also includes occupational codes with three digits[16].

Tables 5 to 8 show the estimated results separated by gender. Columns (1) and (3) refer to male results, and columns (2) and (4) refer to female results. For all years, we find a positive effect of age, with a concavity expressed by the variable age squared. These effects are expected, because they reflect the experience or the greater familiarity of the worker with the labor market. The concavity is verified because the incremental value of experience along the years has decreasing returns to the production and, consequently, to the individual remuneration. Some studies use the age variable as a proxy for experience. However, this is not a good approach to infer women's labor experience, because they experience time out of the labor market to have and raise children. Therefore, variable age measures more the impact during the lifetime than the labor experience. In order to have some control on labor experience, results for 2007 also includes the variable 'tenure on the job', that captures part of this effect.

The second variable category is the regional dummies. Except for 2007, Southeast, the excluded category, has a bigger positive impact on wages for men and women. In 2007 it is possible to verify 'Center' as the region that better pays men and women in all regressions. This may be an effect of migration to the Southeast that began to occur in the 1960s and stabilized at the end of the 1990s as growth registered in the Central region, which was poorly occupied until the end of the 1980s[17].

Education dummies are the third control variables. For both men and women, wage increases with higher education degree. The impact of education is consistently greater for males than females throughout the categories and years[18].

Finally, there is the occupation and industry impact on wages. Because occupation is divided into many groups, its analysis is too intricate. However, industry indicators are fewer, and we can see a tendency on the estimated coefficients. For males, the industrial sector pays more. For females, public administration confers more wage benefits than other occupations. These effects may be a combination of discrimination with gender comparative advantage.

[16] We have a different number of categories for each year, being more specific in recent years. However, for all samples we used the most detailed variable available.
[17] During the 1950s the National Capital City moved from Rio de Janeiro (Southeast) to Brasilia (Center). However, the population boom for the region continued until the 1980s, not only to the new capital but also for other states such as Mato Grosso and Mato Grosso do Sul, where the agribusiness and wood collectors were installed.
[18] The same result was found using quantile estimation in Santos and Ribeiro (2006).

Bergmann (1974) sets a model to test the profitability function of occupation discrimination against the sociological purpose of it. She concludes that the latter may have a bigger influence on decision-takers. Using her model, we can conclude that activities with more social impact appear to suit women more and those where technical appeal is stronger, suit men better. Therefore, recruiters prefer to attribute each individual to the economic sector that best suits his/her gender rules (Hochschild, 2003).

For 2007 data, we also made an additional model that includes race, manager indicator and tenure on the job. Results are on columns (5) and (6) of table 8. The variables analyzed earlier maintain their impact and significance. The included variables have significance for both men and women. The race impact demonstrates that Asiatic individuals earn bigger wages than other races. Tenure on the job is another variable that consistently increases wages. However, in this case, the impact on female wages is bigger than on male wages. Staying for more than 5 years in the same job has a positive impact on male and female wages; however, the impact on women's wages is 5 percent bigger[19]. This result is very interesting, because it may mean the need of women to use their labor participation constancy to signal that they wish to continue in their jobs. Intermittency is one special characteristic of the labor market for women. For many years, women used to work only before getting married or, in some cases, until having the first child. However, nowadays both maternity leave benefits and the degree of effort women put into their education make possible remaining in the labor market after having a family. Even so, employers may doubt this intention and reward with higher wages only women that communicate better their intentions. This effect appears to be the same that Spence posed for education (Spence, 1973).

Finally, the 'manager effect' has no significant impact for either men or women. Our result is similar to Budig and England (2001), who did not find a significant effect of the variable authority on wages.

These results point to better conditions for females in the Brazilian labor market; however, by no means are they conclusive. One way to discover better answers is to use the Oaxaca decomposition, as shown in equation (4). Using the female characteristics and inputting them both on male and on female estimated coefficients, we can compare a woman being paid 'like a man' and 'like a woman'. If the individual maintains all her characteristics but is paid differently, we can say there is room to call it discrimination. Table 10 shows these results for the four analyzed years.

[19] This difference is statistically significant at 5%.

For each year, we used the estimated coefficients in equations (2) and (3) to estimate the predicted hourly wage for the women's sample. Table 10 reports the results without logarithmics, i.e. each value represents the predicted wage for women considering their own characteristics inputted both on men's estimated coefficients and women's estimated coefficients. We report the difference in market remuneration for men and women by a percentage. Rows with 'difference' represent how many percent women earn less than men. All the predicted values were tested and were significantly different. We observe that men used to earn bigger wages than women and continue to do so nowadays. However, this difference was 33 percent and, in 2007, is slightly higher than 16 percent. For 2007, we have two estimations: one with the equation that retains the controls available for other years (as in Tables 5 to 8), and the other with the additional controls of race, tenure and authority (Table 9). We note that with better controls, this difference is reduced.

A final comment concerning these results is that we conclude that the difference in pay in Brazil is decreasing when comparing both genders. However, some aspects are not dealt with in this methodology. As we use a control for occupations and all the preceding discussions show that there is some evidence of gender segregation in some occupations, we might be underestimating this difference.

5. Conclusion

As in other countries, labor market conditions for women in Brazil also are presenting improvements. Labor regulation provides both the positive effect of guaranteeing the presence of an adult in households with children, mainly by paid maternity leave, and the negative effect of increasing informal hiring. In addition to regulation, discrimination and different preferences in hiring explain part of the wage gender gap.

The present analysis of the Brazilian labor market shows that there is gender segregation in occupations and industries; however, it does not have a negative impact for all categories. For those where women receive higher remuneration than men, we observe their higher education, meaning women are being remunerated better by their characteristics. This result is compatible with that of Madalozzo and Martins (2007) which used quantile regression to investigate the wage gap by conditional distribution.

Estimation results show different returns for all variables depending on gender. Usually, women are more poorly remunerated by their characteristics than men. The Oaxaca decomposition reinforces this conclusion showing that, for the same characteristics, men are better paid than women. This difference is falling, but is still a significant 15.4 percent, on

average, in 2007. Compared with Giuberti and Menezes-Filho (2005), the present study improves the quantification of this wage gap, showing that the trend of a decreasing gap remains, but is losing pace overtime.

Since women's participation in the labor market is an endogenous decision with remuneration of their work, this persistent difference when compared to men is a potential disincentive to better education and constancy in the market. Both conditions are dangerous to the economy: education by perpetuating the Brazilian income inequality (Bourguignon, Ferreira, & Menéndez, 2007); and constancy by appealing to women to leave the labor market more often because of the opportunity costs of maintaining 'two shifts'. Researchers and policy-makers should pay attention to these impacts and provide viable alternatives to ensure women's entrance into the labor market.

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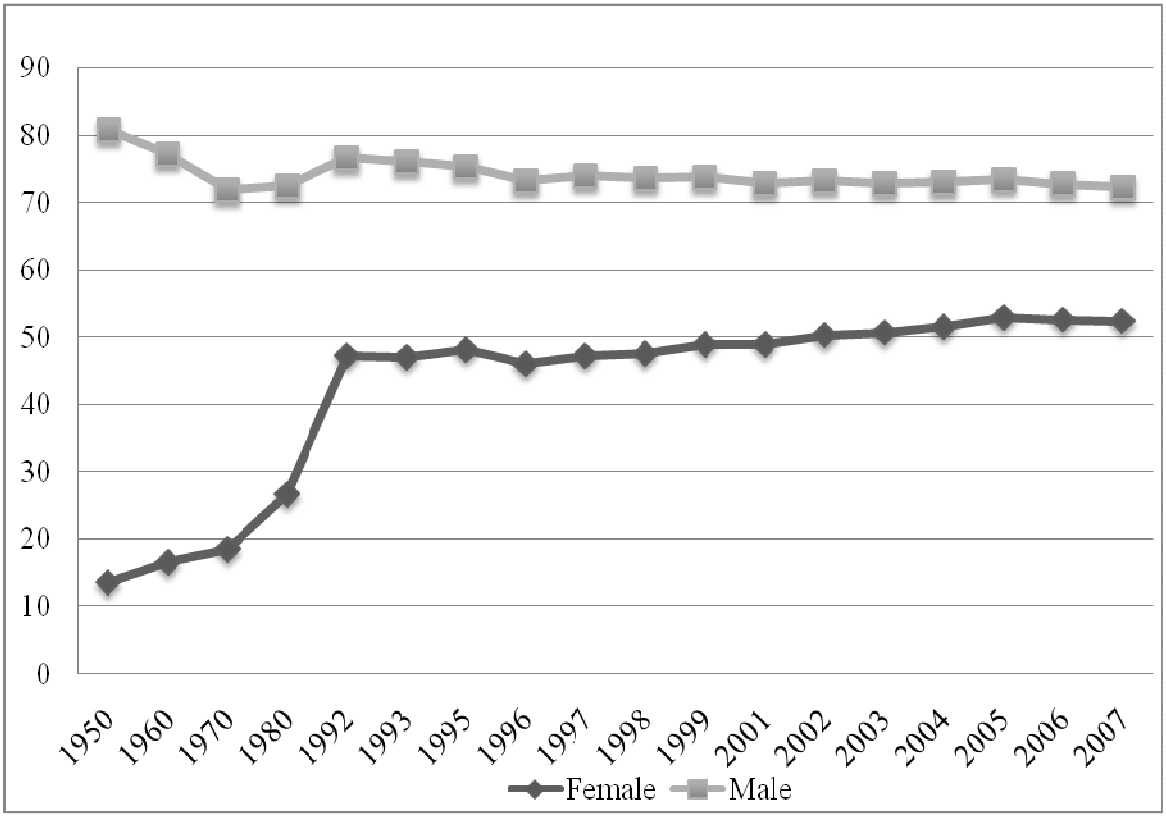
Figure 1: Labor Market Participation. Male and Female, 1950–2007.



Source: IBGE, Estatísticas do Século XX.

Table 1: Percentage of females in traditionally male and traditionally female occupations.

Traditionally Male Occupations					Traditionally Female Occupations				
	Percent Female					Percent Female			
Occupation	**1978**	**1988**	**1998**	**2007**	**Occupation**	**1978**	**1988**	**1998**	**2007**
Engineers	4.94	2.47	8.35	10.08	Registered nurses	86.94	89.92	86.83	86.48
Lawyers	18.18	25.86	38.40	43.86	Librarians	89.56	82.10	92.55	79.41
Physicians	18.29	22.07	48.15	42.87	Schoolteachers	90.58	88.87	91.41	81.54
Economists	18.76	16.84	32.44	76.13	Bank tellers	54.70	72.43	51.94	55.51
Clergy	20.54	14.25	27.79	24.96	Secretaries	52.23	98.26	61.48	62.39
Insurance agents	10.46	0.00	28.69	32.69	Typists	37.04	26.25	91.82	13.40
Managers and administrators	16.77	17.10	28.59	36.48	Sewing machine operators	95.17	97.00	93.54	91.99
Carpenters	1.05	0.28	2.20	2.04	Dental assistants	22.53	22.87	53.49	55.27
Auto mechanics	0.29	1.19	0.47	1.36	Child-care workers	-	100.00	97.86	97.76
Telephone line installers	0.76	0.00	6.28	3.05					
Drivers	0.17	0.40	1.20	1.59					
Police and Detectives	2.28	11.86	11.71	12.23					

Table 2: Hourly wage by gender and occupations: 1978 and 2007.

	Hourly Wage			
	1978		2007	
Occupation	Men	Women	Men	Women
Engineers	178.55	158.88*	31.00	22.45
Lawyers	206.96	135.82*	22.84	19.32*
Physicians	263.65	125.52*	51.23	35.15*
Economists	246.08	130.70*	23.29	14.74*
Clergy	34.85	14.40*	7.22	3.99*
Insurance agents	69.06	80.63	13.51	11.89
Managers and administrators	99.08	70.11*	17.97	15.34*
Carpenters	21.69	8.56*	4.36	2.26*
Auto mechanics	24.04	10.70*	4.95	8.30*
Telephone line installers	34.54	19.79*	5.36	4.64*
Drivers	27.13	38.04*	6.36	8.42*
Police and Detectives	52.64	43.43*	12.47	15.44*
Registered nurses	31.38	22.76	12.40	12.76
Librarians	26.60	51.22*	91.61	11.86
Schoolteachers	55.65	33.31*	9.87	8.75*
Bank tellers	51.43	22.36*	12.48	9.02*
Secretaries	32.70	29.56*	7.43	5.93*
Typists	28.00	22.12*	8.01	2.81*
Sewing machine operators	30.26	12.57*	3.29	3.25
Dental assistants	192.14	133.04*	23.58	21.64
Childcare workers	-	-	6.79	7.00

Note: Asterisks (*) means the female and male values are different at 95%¨of confidence.

Table 3: Hourly wage by gender and industries: 1978 and 2007.

	Hourly Wage			
	1978		2007	
Activity	Men	Women	Men	Women
Agricultural	14.86	6.49*	3.10	0.91*
Transformation Industry	38.11	17.42*	7.12	4.33*
Construction	23.21	38.82*	4.72	19.72*
General Industry	31.46	33.10	10.45	11.02
Comerce	38.26	21.81*	6.48	4.83*
Services	40.00	12.30*	7.65	3.56*
Transportation	32.67	26.39*	7.28	7.45
Social Services	74.35	32.77*	13.45	8.26*
Public Administration	50.08	45.15*	12.02	10.99*
Other Activities	78.14	38.85*	9.12	7.04*

Table 4: Percentage of male and female by education and industry: 1978 and 2007.

Panel A: 1978

	No education	1 to 4 years	5 to 8 years	9 to 11 years	More than 11 years
Male Workers					
Agribusiness	62.82%	30.92%	9.28%	3.39%	1.39%
Transformation	8.67%	19.73%	24.87%	24.65%	19.92%
Construction	11.40%	14.71%	9.71%	4.78%	5.54%
Other industrial activities	1.86%	2.38%	2.13%	3.22%	3.13%
Commerce	5.45%	9.75%	15.55%	17.10%	7.66%
Services	4.68%	9.82%	14.59%	13.57%	15.05%
Transportation and Communication	2.68%	6.87%	9.47%	6.17%	3.34%
Social	0.74%	1.77%	3.50%	5.63%	21.03%
Public Administration	1.10%	2.99%	7.87%	10.39%	13.23%
Other activities	0.59%	1.07%	3.03%	11.11%	9.71%
Female Workers					
Agribusiness	49.00%	23.37%	5.55%	0.37%	0.06%
Transformation	6.71%	14.00%	17.68%	11.16%	6.89%
Construction	0.10%	0.24%	0.47%	1.29%	1.55%
Other industrial activities	0.32%	0.28%	0.31%	1.05%	1.56%
Commerce	3.72%	7.82%	17.25%	12.85%	4.08%
Services	35.87%	42.26%	31.07%	12.27%	7.70%
Transportation and Communication	0.20%	0.72%	1.90%	2.78%	2.03%
Social	2.65%	8.95%	20.00%	43.35%	57.74%
Public Administration	0.39%	1.06%	3.33%	7.35%	10.46%
Other activities	1.04%	1.29%	2.43%	7.55%	7.94%

Panel B: 2007

	No education	1 to 4 years	5 to 8 years	9 to 11 years	More than 11 years
Male Workers					
Agribusiness	53.37%	35.28%	15.30%	5.78%	1.82%
Transformation	7.95%	12.11%	18.36%	21.93%	13.70%
Construction	14.54%	18.55%	16.50%	7.07%	3.43%
Other industrial activities	0.84%	0.93%	1.13%	1.83%	1.66%
Commerce	9.84%	13.20%	21.04%	24.69%	16.05%
Services	2.86%	3.27%	3.72%	3.95%	4.86%
Transportation and Communication	3.75%	6.87%	9.91%	9.07%	5.20%
Social	0.67%	1.01%	1.40%	3.53%	16.42%
Public Administration	2.03%	2.67%	3.12%	7.89%	13.38%
Other activities	4.15%	6.09%	9.51%	14.25%	23.47%
Female Workers					
Agribusiness	44.39%	31.19%	11.32%	2.93%	0.59%
Transformation	8.12%	11.74%	16.08%	14.21%	6.87%
Construction	0.29%	0.36%	0.35%	0.55%	0.95%
Other industrial activities	0.11%	0.07%	0.11%	0.26%	0.68%
Commerce	8.32%	9.43%	15.36%	25.48%	11.86%
Services	27.98%	33.26%	36.66%	18.25%	4.78%
Transportation and Communication	0.31%	0.42%	0.85%	2.43%	2.55%
Social	3.51%	5.16%	6.59%	17.70%	44.52%
Public Administration	1.25%	1.46%	2.10%	5.21%	10.67%
Other activities	5.71%	6.90%	10.57%	12.98%	16.53%

Table 5: Estimation Results, 1978.

	Men (1)	Women (2)	Men (3)	Women (4)
Intercept	0.24	0.09	2.11	0.61
	(9.67)	(2.24)	(17.90)	(1.81)
Age	0.08	0.08	0.06	0.07
	(63.63)	(36.55)	(48.99)	(33.32)
Age Squared	-0.00	-0.00	-0.00	-0.00
	(-49.81)	(-28.09)	(-38.27)	(-26.19)
South	-0.19	-0.26	-0.18	-0.24
	(-28.73)	(-25.19)	(-30.31)	(-24.03)
North	-0.25	-0.33	-0.23	-0.34
	(-16.72)	(-15.85)	(-17.08)	(-17.59)
Northest	-0.39	-0.66	-0.40	-0.65
	(-64.61)	(-73.17)	(-70.82)	(-73.94)
Center	-0.07	-0.21	-0.10	-0.20
	(-6.18)	(-12.00)	(-8.79)	(-12.22)
Education 1	0.39	0.35	0.25	0.21
	(62.91)	(33.42)	(43.65)	(21.39)
Education 2	0.77	0.75	0.49	0.45
	(93.76)	(57.41)	(62.67)	(34.94)
Education 3	1.28	1.25	0.83	0.79
	(123.10)	(85.13)	(78.68)	(49.39)
Education 4	2.09	1.91	1.30	1.24
	(177.68)	(113.56)	(95.77)	(64.64)
Transformation	0.52	0.30	0.29	0.56
Industry	(69.39)	(19.11)	(11.23)	(4.62)
Construction	0.39	0.61	0.27	0.67
	(48.16)	(12.04)	(9.90)	(5.20)
General	0.38	0.50	0.28	0.70
Industry	(24.44)	(10.10)	(9.30)	(5.33)
Comerce	0.50	0.45	0.24	0.43
	(56.49)	(26.23)	(8.75)	(3.54)
Services	0.42	0.01	0.19	0.41
	(47.05)	(1.14)	(6.98)	(3.33)
Transportation	0.51	0.44	0.39	0.57
	(47.81)	(12.98)	(13.61)	(4.52)
Social Services	0.38	0.35	0.22	0.48
	(26.49)	(22.79)	(7.40)	(3.98)
Public	0.45	0.62	0.28	0.70
Administration	(37.12)	(25.98)	(9.61)	(5.72)
Other	0.70	0.77	0.54	0.90
Activities	(45.16)	(32.43)	(17.30)	(7.36)
Occupations	No	No	Yes	Yes
Adjusted R^2	0.4890	0.5251	0.5817	0.5957
Number of Observations	103,142	44,493	103,142	644,493

Note: Between parenthesis are the t-statistic for each coefficient.

Table 6: Estimation Results, 1988.

	Men (1)	Women (2)	Men (3)	Women (4)
Intercept	2.68	3.24	4.70	4.76
	(22.02)	(17.08)	(26.87)	(4.04)
Age	0.09	0.06	0.06	0.04
	(15.83)	(6.50)	(11.12)	(4.66)
Age Squared	-0.00	-0.00	-0.00	-0.00
	(-13.14)	(-4.84)	(-9.37)	(-3.67)
South	-0.21	-0.15	-0.21	-0.17
	(-6.47)	(-3.30)	(-6.36)	(-3.72)
North	0.01	-0.05	-0.00	-0.11
	(0.17)	(-0.42)	(-0.06)	(-1.07)
Northest	-0.45	-0.60	-0.46	-0.65
	(-11.28)	(-9.35)	(-11.61)	(-10.02)
Center	-0.10	-0.09	-0.10	-0.12
	(-2.53)	(-1.72)	(-2.61)	(-2.26)
Education 1	0.44	0.42	0.28	0.26
	(11.14)	(6.48)	(7.16)	(4.09)
Education 2	0.83	0.74	0.50	0.44
	(17.37)	(10.14)	(10.18)	(5.84)
Education 3	1.43	1.35	0.90	0.92
	(26.18)	(17.19)	(15.13)	(10.46)
Education 4	2.17	2.09	1.35	1.45
	(36.47)	(24.80)	(18.73)	(14.02)
Transformation Industry	0.57	0.20	0.35	0.26
	(13.47)	(1.03)	(3.24)	(0.98)
Construction	0.29	0.33	0.21	0.69
	(6.19)	(1.29)	(1.77)	(1.91)
General Industry	0.64	0.63	0.47	0.76
	(7.12)	(2.65)	(3.24)	(2.16)
Comerce	0.38	0.21	0.17	0.23
	(7.99)	(2.13)	(1.46)	(0.85)
Services	0.24	-0.21	-0.08	0.11
	(4.77)	(-2.38)	(-0.70)	(0.43)
Transportation	0.50	0.28	0.40	0.17
	(8.61)	(1.24)	(3.40)	(0.49)
Social Services	0.32	0.11	0.13	0.20
	(4.27)	(1.11)	(0.93)	(0.77)
Public Administration	0.29	0.30	0.07	0.36
	(4.67)	(2.38)	(0.61)	(1.32)
Other Activities	0.81	0.53	0.48	0.66
	(13.34)	(4.63)	(4.14)	(2.54)
Occupations	No	No	Yes	Yes
Adjusted R^2	0.3135	0.3473	0.3774	0.4052
Number of Observations	8,111	3,466	8,111	3,466

Note: Between parenthesis are the t-statistic for each coefficient.

Table 7: Estimation Results, 1998.

	Men (1)	Women (2)	Men (3)	Women (4)
Intercept	-1.87	-1.74	-0.45	-0.60
	(-58.68)	(-40.06)	(-9.67)	(-3.21)
Age	0.08	0.06	0.06	0.05
	(46.75)	(27.76)	(38.91)	(24.05)
Age Squared	-0.00	-0.00	-0.00	-0.00
	(-37.25)	(-20.49)	(-31.67)	(-18.03)
South	-0.09	-0.10	-0.08	-0.10
	(-11.15)	(-10.04)	(-11.05)	(-10.53)
North	-0.26	-0.26	-0.26	-0.27
	(-19.29)	(-16.24)	(-20.62)	(-17.91)
Northest	-0.43	-0.50	-0.42	-0.48
	(-60.34)	(-57.70)	(-62.92)	(-58.61)
Center	-0.07	-0.12	-0.09	-0.12
	(-6.12)	(-8.27)	(-7.94)	(-9.30)
Education 1	0.29	0.21	0.20	0.16
	(30.28)	(14.92)	(22.45)	(12.40)
Education 2	0.57	0.44	0.38	0.33
	(54.54)	(30.18)	(38.61)	(23.31)
Education 3	0.97	0.86	0.64	0.57
	(87.09)	(56.14)	(57.37)	(37.05)
Education 4	1.78	1.57	1.12	1.03
	(135.85)	(94.79)	(79.14)	(57.96)
Transformation	0.60	0.51	0.16	0.20
Industry	(59.65)	(25.21)	(7.37)	(4.16)
Construction	0.49	0.71	0.09	0.34
	(47.50)	(15.34)	(3.99)	(5.36)
General	0.64	0.72	0.31	0.53
Industry	(30.47)	(16.37)	(10.67)	(8.19)
Comerce	0.51	0.51	0.10	0.19
	(49.87)	(26.36)	(4.32)	(3.86)
Services	0.44	0.32	-0.03	0.09
	(42.71)	(18.17)	(-1.22)	(1.86)
Transportation	0.67	0.78	0.25	0.35
	(53.01)	(22.26)	(10.86)	(6.03)
Social Services	0.61	0.61	0.10	0.19
	(39.35)	(31.97)	(3.80)	(4.06)
Public	0.68	0.78	0.07	0.30
Administration	(50.02)	(33.67)	(2.92)	(6.13)
Other	0.67	0.78	0.16	0.34
Activities	(50.98)	(34.66)	(7.19)	(6.93)
Occupations	No	No	Yes	Yes
Adjusted R^2	0.4870	0.4792	0.5677	0.5593
Number of Observations	70,440	43,320	70,440	43,320

Note: Between parenthesis are the t-statistic for each coefficient.

Table 8: Estimation Results, 2007.

	Men (1)	Women (2)	Men (3)	Women (4)	Men (5)	Women (6)
Intercept	-0.95	-0.84	0.15	0.61	0.27	0.71
	(-32.98)	(-22.11)	(1.89)	(1.81)	(3.37)	(2.11)
Age	0.07	0.05	0.05	0.05	0.05	0.04
	(46.91)	(31.21)	(39.24)	(27.91)	(33.26)	(22.50)
Age Squared	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(-35.28)	(-22.82)	(-29.86)	(-20.08)	(-25.93)	(-16.84)
Black	-	-	-	-	-0.12	-0.05
					(-14.44)	(-5.15)
Mulato	-	-	-	-	-0.11	-0.08
					(-20.71)	(-13.85)
Oriental	-	-	-	-	0.08	0.09
					(2.50)	(2.84)
Native Indigene	-	-	-	-	-0.11	-0.03
					(-2.62)	(-0.59)
Manager Position	-	-	-	-	-0.54	0.66
					(-0.91)	(0.89)
South	0.11	-0.01	0.01	-0.00	-0.01	-0.02
	(1.64)	(-1.01)	(1.13)	(-0.48)	(-2.17)	(-2.27)
North	-0.12	-0.17	-0.10	-0.15	-0.07	-0.12
	(-12.98)	(-14.46)	(-11.20)	(-14.04)	(-7.52)	(-11.32)
Northest	-0.43	-0.42	-0.40	-0.39	-0.38	-0.38
	(-68.96)	(-57.79)	(-67.53)	(-57.71)	(-62.24)	(-54.28)
Center	0.05	0.01	0.03	0.02	0.05	0.03
	(4.63)	(0.64)	(3.35)	(1.44)	(5.30)	(2.54)
Education 1	0.21	0.18	0.17	0.15	0.16	0.15
	(20.95)	(12.01)	(18.14)	(11.14)	(17.56)	(10.86)
Education 2	0.44	0.38	0.34	0.30	0.33	0.29
	(43.53)	(25.87)	(35.44)	(21.96)	(34.62)	(21.49)
Education 3	0.74	0.68	0.54	0.47	0.52	0.45
	(71.71)	(46.52)	(53.14)	(33.74)	(51.89)	(32.79)
Education 4	1.51	1.37	0.98	0.86	0.95	0.83
	(128.62)	(89.18)	(77.73)	(54.24)	(75.45)	(52.58)
Tenure on the job 1	-	-	-	-	0.06	0.06
					(5.57)	(5.68)
Tenure on the job 2	-	-	-	-	0.06	0.10
					(6.36)	(9.93)
Tenure on the job 3	-	-	-	-	0.09	0.16
					(10.85)	(16.92)
Tenure on the job 4	-	-	-	-	0.20	0.25
					(23.99)	(26.23)
Transformation Industry	0.43	0.19	0.21	0.17	0.19	0.16
	(48.50)	(10.82)	(11.51)	(4.19)	(10.61)	(3.87)
Construction	0.28	0.54	0.15	0.23	0.14	0.24
	(30.04)	(12.11)	(7.00)	(4.12)	(6.53)	(4.31)
General Industry	0.58	0.65	0.38	0.39	0.35	0.37
	(27.08)	(12.11)	(13.81)	(6.26)	(12.95)	(5.89)
Comerce	0.32	0.31	0.11	0.13	0.09	0.12
	(37.57)	(17.65)	(5.65)	(3.26)	(4.82)	(2.92)
Services	0.33	0.17	0.17	0.17	0.17	0.17
	(23.81)	(10.27)	(7.17)	(4.19)	(6.91)	(4.12)

	Men (1)	Women (2)	Men (3)	Women (4)	Men (5)	Women (6)
Transportation	0.45	0.47	0.27	0.23	0.25	0.22
	(42.06)	(17.37)	(13.28)	(5.13)	(12.40)	(4.87)
Social Services	0.45	0.43	0.18	0.22	0.16	0.19
	(31.19)	(24.16)	(7.53)	(5.45)	(6.58)	(4.73)
Public Administration	0.60	0.63	0.29	0.39	0.26	0.36
	(49.85)	(31.26)	(13.59)	(9.44)	(12.18)	(8.70)
Other Activities	0.37	0.38	0.15	0.16	0.14	0.16
	(37.75)	(21.21)	(7.79)	(3.96)	(7.34)	(3.89)
Occupations	No	No	Yes	Yes	Yes	Yes
Adjusted R^2	0.4133	0.3971	0.4891	0.4879	0.4971	0.4970
Number of Observations	89,119	61,971	89,119	61,971	89,114	61,970

Note: Between parenthesis are the t-statistic for each coefficient.

Table 9: Oaxaca Results.

	Estimated Average Hourly Wage
1978	
As men	14.51
As women	9.71
Difference	−33.05%
1988	
As men	261.57
As women	201.35
Difference	−23.02%
1998	
As men	1.90
As women	1.55
Difference	−18.42%
2007	
As men	3.97
As women	3.22
Difference	−16.19%
2007 with more controls	
As men	3.96
As women	3.35
Difference	−15.40%