

# Trade Openness and Gender Discrimination

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## Abstract

This paper investigates the impact of trade liberalization on gender wage discrimination. We employ a simple method that is able to capture the direct impacts of openness at the industry level on the gender wages. We find evidence that increasing openness is associated with narrowing wage gap, which results mainly from men's wages declining. This is consistent with the Becker's (1957) proposition that competition reduces discrimination in the labor market.

Keywords: gender; discrimination; labor market; competition; trade liberalization.  
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## 1. Introduction

One issue that still attracts much attention of the academia is discrimination in the labor market. Although thousands of pages have been written on this matter, economists are often skeptical about the empirical results because of econometric problems such as self-selection and unmeasured abilities. Discrimination in the labor market has been associated to noncompetitive product markets, and the most common argument assumes that there is a positive differential between wages of men and women higher than productivity differences caused by employer tastes (Becker, 1957). As a result, the least discriminatory firm will hire cheaper labor. In the long run, if the industry is competitive, discriminatory firms will be forced to leave the market. Discrimination may exist, however, in noncompetitive environments, where the lack of competition and barriers to entry allow it to exist. Empirical results on product market power have supported the Beckers' model (Ashenfelter and Hannan, 1986; Hellerstein *et.al*, 2002). More recently, there is a growing interest on the gender effects of trade policies, but sound empirical evidence is still sparse.

This paper tests the hypothesis that competitive market forces reduce or eliminate discrimination using the case study of a developing country that experienced rapid trade liberalization after a long period of economic closeness. This strategy entails significant advantages over the previous studies of this matter. First, our case study, Brazil, benefits from the availability of a long and reliable series of individual-level data covering the periods before, during and after trade liberalization, that enables the control for human capital, formal/informal labor contract, among several other variables. In other countries where this issue has been investigated, the available individual-level data are often much less comprehensive. Second, the fact that the trade liberalization took place in a short period of time after successive decades following a vigorous import substitution strategy characterizes the Brazilian experience as a (quasi) natural experiment, thus making it an especially suitable case to investigate the effects of trade on gender discrimination. Third, contrary to the typical strategy of “before and after” and/or the aggregate analyses applied by previous papers that examined the association between openness and gender discrimination (Oostendorp, 2002; Berik, 2000; Ghiara, 1999), we employ a simple method that captures the impacts of openness at the industry level on the gender wages.

Artecona and Cunningham (2002) find similar results than ours, but they are not statistically significant.

The plan of the paper is as follows. The next section presents the trade liberalization in Brazil. Section 3 presents the data, strategy and results. The last section concludes.

## **2. The Brazilian trade liberalization**

Before 1990, the Brazilian economy was highly protected and regulated. Successive administrations had followed a vigorous import substitution industrialization strategy aimed at protecting the domestic market. Trade barriers were expanded through tariffs, import licenses, different exchange rate regimes for imports and exports, and other measures such as taxes and subsidies. More than half of all industrial products were in the “Anexo C”, a list of items that could not be imported. Such policies left Brazil an especially closed economy by the end of the 1980s. Some modest reduction in tariffs and the lifting of some redundant barriers began in 1988, but the major break with the import substitution strategy started in 1990, under the incoming President Collor administration, when efforts to contain inflation were combined with drastic trade liberalization. The new government introduced a four-year schedule to reduce protection, but in practice it was finished in only three years. By the middle of 1993, most of the complex and bureaucratic non-tariff barriers had been removed, and a new tariff structure was imposed which substantially reduced protectionism.

In 1987 the weighted average nominal tariff was 55%; by 1992 it had been reduced to 14%. This was accompanied by a sharp fall in the range of tariffs, reducing the standard deviation to about one third of the previous figure. The weighted average effective tariff, which remained largely unchanged in the 1980s, dropped from 68% in 1987 to 18% in 1992, while the standard deviation declined from 54% to 17% (Kume et al., 2003). While these tariff reductions were not severe by international standards, the removal of the non-tariff barriers shifted the pattern of protection, especially for the manufacturing sector, and signaled that the long period of protectionism was at an end. Trade therefore boomed between 1990 and 1996 with imports rising by 257% and exports by 151%.

## **3. Empirical evidence**

Our main data source, the *Pesquisa Nacional por Amostra de Domicílios* (PNAD), is a series of nationally representative cross-section household surveys which have been carried out every year since 1976, excepting 1980, 1991, 1994 and 2000.<sup>1</sup> PNAD is conducted using a consistent methodology by the government's statistical agency, *Instituto Brasileiro de Geografia e Estatística* (IBGE). We use data from 1982 to 1999, thus giving a long series each side of the trade liberalization. Each PNAD contains data on roughly 350,000 individuals in about 100,000 randomly selected households following face-to-face interviews. We restrict our analysis to employed individuals earning a positive wage, aged between 18 and 65, affiliated to the manufacturing sector.

To test the hypothesis that trade liberalization contribute to reduce discrimination, we first divided our sample in two periods: pre-liberalization (1982-1990) and post-liberalization (1992-1999). Female jobs share grew 9.2% after the trade liberalization, passing from 24.9% at pre-liberalization period to 27.2% at the post-liberalization period. Table 1 shows the means and standard deviation of the hourly real wage for male and female. The women's wage grew about 5.4% after the trade liberalization, while the men's wage fell about 12.5% in the same period. Over 1982-90, the women's wage was about 54% of that of men, while in 1992-99 it was about 65%. So, the gender wage gap reduced after the openness.

**Table 1: Mean and standard deviation of the hourly real wage (R\$)**

Period	Statistic	Women	Men	Women/Men
Pre-liberalization	Mean	2.05	3.77	0.54
	Standard deviation	3.64	6.59	
Post-liberalization	Mean	2.16	3.30	0.65
	Standard deviation	3.80	7.31	

In order to examine the gender wage gap before and after the trade liberalization controlling for productive endowments, we employ the Blinder-Oaxaca wage decomposition for the pre- and post-liberalization periods. We regress the log of the hourly real wage against education, age, age squared, race, head of family, formal/informal labor relation dummy, urban region, and metropolitan area. Table 2 shows the results of the wage gap decomposition. The raw wage gap was reduced from 58% at the pre-liberalization period to 43% at the post-liberalization period. The gender wage gap that can

<sup>1</sup> In 1991 and 2000 there were national censuses. In 1994, the survey was cancelled due to a shortage of funds.

be attributed to non-observable characteristics and/or discrimination fell from 30% to 28%. It can be noticed that the raw gender wage gap and the residual wage gap reduced in the post-liberalization.

**Table 2: Wage decomposition**

	Pre-liberalization	Post-liberalization
Gender wage gap	0.578	0.432
Residual wage gap (discrimination)	0.298	0.276
Male wage advantage	0.067	0.067
Female wage disadvantage	0.216	0.196

Note: the wage decomposition was carried out using the Oaxaca and Ransom (1994) technique.

Although the split of the period in pre- and post-liberalization allows some analysis of the gender wage gap before and after the trade liberalization, it does not take into account that openness has taken place at different timing and intensity at different industries. So, the impacts of the trade liberalization on the gender wage gap may vary significantly at the industry level. To take these differences in consideration we use the openness index proposed by Arbache, Dickerson and Green (2004). Let  $e_{jt}$  denote the effective rate of protection in industry  $j$  at time  $t$ . The measure of openness in industry  $j$  at time  $t$  can be defined as  $open_{jt} = \exp(-e_{jt})$ . Thus, higher tariffs are represented by smaller values of  $open_{jt}$  and lower values of tariffs are represented by larger values of  $open_{jt}$ , since they show greater potential for external competition. Hence, the metric has a sensible interpretation. The effective tariff data are from Kume et al. (2003).<sup>2</sup> So, rather than imposing a simple before-and-after indicator of trade reform, this strategy more accurately shows the timing and extent of trade liberalization and also introduces some cross-sectional variation in the trade regime.

In practice, the openness indicator ranged from 0.032 to 0.920 across trading industries in 1987, and from 0.246 to 1.024 in 1998. The extremes in both years were the highly protected vehicles industry at the bottom end, and the petroleum industry at the top

<sup>2</sup> The effective tariffs take into account input and output tariffs. However, they do not take in consideration non-tariff barriers, which were particularly significant in Brazil before trade liberalization. These data are available only from 1987 to 1998. We acknowledge that changes in non-tariff barriers could have been important over time, however we cannot measure them.

end, which experienced some negative tariffs, that is, export subsidies. In fact, the petroleum industry remained largely open to the world market throughout the period, while most other industries were opened up at varying rates. The vehicles and parts industry, by contrast, was completely closed in 1990, with an index of 0.02; it was then opened up to 0.42 in 1993, 0.68 in 1994, and then tariffs were re-imposed; the index finished at 0.25 in 1998. The mean level of openness peaked at 0.865 in 1995 and 1996.

We estimate Mincerian wage regressions against our measure of openness and interactions of this measure and gender dummies. We control for sources of inter-industry wage variation by including a vector of 19 manufacturing industry dummies, so that the openness measure will pick up sources of variation over time which differ across industries. We also include controls for education, age, age squared, race, head of family, formal labor relation, geographic region, metropolitan area and urban region.

Table 3 presents the estimates of the different impacts of trade liberalization using the measure of the changing degree of openness. Model 1 shows that greater openness is associated with lower wages, i.e., wages fell most in those industries where openness raised more. Its value suggests that, *ceteris paribus*, a 1% fall in the average tariff rate (an increase in openness) at the mean reduce wages by about 0.14%. Given that tariffs fell substantially after 1990, the associated impact of openness on wages was considerable. The specification in Model 2 includes interactions between the measure of openness and male and female in order to ascertain whether the impact of greater openness is borne disproportionately by gender. The estimates suggest that greater openness is associated with substantially lower returns to male as compared to female. While it is -18% for men, it is only -4.6% for women. Therefore, the men's wages suffered the most after openness.

**Table 3: Openness and returns by gender**

	Model 1		Model 2	
White	0.171	(0.004)	0.171	(0.004)
Years of study	0.106	(0.001)	0.106	(0.001)
Age	0.067	(0.001)	0.067	(0.001)
Age squared	-0.001	(0.000)	-0.001	(0.000)
Head of family	0.213	(0.004)	0.213	(0.004)
Formal labor relation	0.257	(0.005)	0.256	(0.005)
Northwest	-0.233	(0.009)	-0.233	(0.009)
Central West	-0.031	(0.010)	-0.032	(0.010)
South	0.011	(0.009)**	0.011	(0.009)**
Southwest	0.102	(0.008)	0.101	(0.008)
Urban region	0.030	(0.006)	0.030	(0.006)
Metropolitan area	0.088	(0.004)	0.087	(0.004)
Woman	-0.275	(0.005)	-0.385	(0.018)
Open	-0.146	(0.014)		
Woman*open			-0.047	(0.021)*
Man*open			-0.197	(0.017)
No. of observations	137,786		137,786	
R <sup>2</sup>	0.53		0.53	

Notes: Robust standard errors in parentheses are corrected for potential inter-industry/year group correlation. 19 manufacturing industry dummies are also included, being significant at the 1% level, with exception of the electric-electronic industry and the vehicle and parts industry. All coefficients are significant at the 1% level unless otherwise indicated: \*significant at the 5% level; \*\*insignificantly different from zero at conventional levels. The period under analysis is 1987-1998 due to tariff data constraints.

#### 4. Conclusion

This paper investigated the impact of trade liberalization on gender discrimination. We find evidence that increasing openness is associated with lower wages, but the downward impact of openness on wages is significantly higher for men. The fact that the narrowing wage gap results mainly from men's wages declining suggests that trade reforms generate reductions in rents where they exist. These results are consistent with the Becker's (1957) proposition that competition potentially reduces discrimination in the labor market.

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