

Foreign Trade and the Gender Earnings Differential in Urban Mexico

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Abstract

This paper examines the effect of foreign trade induced product market competition, upon workplace gender discrimination in urban Mexico as measured by the gender earnings differential. More than 3 decades ago, Becker (1957) argued that labor market discrimination was economically inefficient in that discriminating firms must forego a quantity of profit. Thus, firms with more market power, i.e., firms facing less competition, may be likelier to discriminate. It therefore follows that competition in product markets may reduce discrimination in labor markets. The spread of foreign trade has traditionally been a major factor in increased product market competition. Hence, Becker's thesis suggests foreign trade will reduce employment discrimination. This paper finds evidence of a negative relation between foreign trade linked competition in product markets and workplace gender discrimination in data from the Mexican National Urban Employment Survey (Encuesta Nacional de Empleo Urbano).

- **JEL Classifications:** F160, J160, J700
- **Key words:** Gender discrimination, Trade liberalization, Mexico

I. Introduction

While it is agreed there have been notable gains from international trade in recent years, there is lingering concern that trade liberalization, proceeding ever more rapidly under the auspices of the World Trade Organization, has not

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benefited all but that the gains have been distributed unevenly both internationally and within countries. In particular, there is apprehension that trade liberalization has led to marginalization of the poor in low-income countries. Women are disproportionately among the poor in many less developed countries. Therefore, there is concern trade liberalization has diminished the livelihoods of women in many low-income countries (e.g., Wee, 1998).

This paper argues trade liberalization may improve the *relative* economic status of women in low-income countries in that free trade potentially reduces workplace gender discrimination. This does not contradict claims of the worsening, *in absolute terms*, of the economic status of women in the developing world following trade liberalization. Only, reduction in gender earnings differentials implies the worsening economic status of women must be due to their overrepresentation in sectors of the economy particularly susceptible to import or export competition. The problem, therefore, may be industrial and occupational segregation.

This study examines the effect of foreign trade, upon labor market discrimination in urban Mexico as measured by the gender earnings differential. It is found that trade liberalization is associated with a narrower male-female earnings gap. This implies future trade liberalization under the aegis of the World Trade Organization may improve the *relative* economic status of women in low-income countries. This would be a significant beneficial effect of the WTO agreement upon low-income countries. The remainder of the paper proceeds as follows: section II discusses the effect of product market competition, always intensified by trade liberalization, on labor market discrimination; section III describes Mexico's rapid transition from a closed to an open economy, and, briefly, the extent of workplace gender discrimination in urban Mexico as measured by the female-male earnings ratio; section IV describes the empirical methodology used to uncover the effect of trade liberalization upon the gender earnings differential; section V describes the data upon which the empirical analyses are based, and presents ensuing statistical evidence and related discussion; section VI summarizes these findings and briefly concludes.

II. Product Market Competition and Employment Discrimination: the Theory and Evidence

More than four decades ago, Becker (1957) advanced the provocative thesis that firms' discriminatory practices in the hiring and remuneration of workers were economically inefficient. The author held that firms with a taste for discrimination',

i.e., a preference for, e.g., male workers, must forego a quantity of profit in the indulgence of this taste. Such firms may employ more male workers and fewer female workers than is profit maximizing, paying male workers higher wages than female workers of equivalent skill. This has the implication that firms better able to withstand a reduction in profit may be more likely to indulge their taste for discrimination. Thus, firms with more market power, i.e., firms facing less competition, may be more likely to discriminate. It therefore follows that increased competition in product markets may result in reduced discrimination in labor markets. The spread of foreign trade has traditionally been a major factor in increased product market competition. Hence, Becker's (1957) thesis suggests that foreign trade will reduce employment discrimination.

There is a fair body of evidence, from agriculture, industry, and even sports, in support of an inverse relation between discriminatory practice and economic performance. Udry (1996), in a study of agricultural households in Burkina Faso, Sub-Saharan Africa, finds evidence of gender discrimination in the allocation of agricultural inputs. In many African households, agricultural production occurs on many plots controlled by different household members. The efficient allocation of inputs requires that the value of the marginal product of inputs be equalized across household plots. Udry (1996) finds instead that plots controlled by women are farmed much less intensively than plots controlled by men. The author estimates that, as a result of this sub-optimal allocation of agricultural inputs, about 6% of output is lost. Using plant-level and firm-level data to examine the relation between profits and female employment, Hellerstein, Neumark, and Troske (1997) find a positive and significant relation between profits and the proportion of women employed in plants with high levels of product market power. No such relationship was found for plants with low levels of market power. This is as expected since it is likely only plants with high levels of market power have super-normal profit opportunities. Hanssen (1998), in a historical study of the performance of professional baseball teams in the U.S., finds a significant positive relationship between the probability of team victory and the presence of black players in the starting lineup during the 1950s, when professional sports in the U.S. were far from racially integrated.

There is also growing evidence that improved competition in product markets reduces discrimination in labor markets. In an influential study of the U.S. banking industry, Ashenfelter and Hannan (1986) find a significant negative relationship between the market power of local banks and the proportion of females employed.

In a study of the U.S. trucking industry, for long one of the most discriminatory industries nationally, Heywood and Peoples (1994) find that industry deregulation in 1979 has improved access to preferable for-hire jobs for black truck drivers. In yet another study of the U.S. banking industry, Black and Strahan (2001) find that the relative wages of female bank employees have significantly risen since competition fostering deregulation of the industry in the mid-1970s. Finally, Black and Brainerd (2000) unearth evidence that increased competition in the U.S. from imports during the 1980s caused greater narrowing of the gender wage gap in historically concentrated or non-competitive industries than in historically non-concentrated industries. This is as expected if improved competition from trade liberalization reduces employment discrimination, since the historically non-concentrated industries were competitive even prior to trade liberalization.

III. The Case of Mexico

Over the past 17 years, Mexico, once adherent to policies of import-substituting industrialization, has transformed itself into one of the world's most open economies. Mexico's enrollment in the GATT in 1986 and the inauguration of NAFTA in 1994 are two notable events in the nation's history of trade liberalization (OECD, 1996). Indeed, Mexico entered into multiple free trade agreements in the 1990s and beyond (see Table 1), including one with the European Union. It is no surprise that there is evidence consistent with increased competition in Mexican product markets as a result of this liberalization of trade (e.g., Hanson and Harrison, 1999).

Table 1. Free Trade Agreements with Mexico

Free Trade Agreement	Signed	Effective
Mexico - United States and Canada (NAFTA)	December 17, 1992	January 1, 1994
Mexico - Costa Rica	April 5, 1994	January 1, 1995
Mexico - Colombia, and Venezuela (G3 - Group of Three)	June 13, 1994	January 1, 1995
Mexico - Bolivia	September 10, 1994	January 1, 1995
Mexico - Nicaragua	December 18, 1997	July 1, 1998
Mexico - Chile	April 17, 1998	August 1, 1999
Mexico - European Union	February 24, 2000	July 1, 2000
Mexico - Israel	April 10, 2000	July 1, 2000
Mexico - El Salvador, Honduras, and Guatemala (Northern Triangle)	June 29, 2000	April 1, 2001

Source: Secretaria de Economia web page <http://www.economia.gob.mx>

Foreign trade linked competition in one sector of the Mexican economy, however, far predates trade liberalization. The *maquiladora* industry began in 1965 with the implementation of Mexico's Border Industrialization Program. This new program was intended to combat unemployment in the border region as a result of the U.S.'s termination of the *bracero* program¹ in 1964. This industrialization program allowed the unrestricted entry of foreign capital into the border region (Baerresen, 1971; Hunt 1970). Mexican government decrees enacted in March 1971 made the value added resulting from manufacturing in Mexico the only portion subject to national taxation (Comercio Exterior, 1971). Given inexpensive Mexican labor, manufactured goods were to be produced in Mexico for export to the United States. Raw materials were to be imported duty free into Mexico from the U.S. and U.S. import duties on the re-export of the finished goods were to be levied only on Mexican value added. This policy resulted in the proliferation, by means of mostly U.S. capital, of export specialized manufacturing units, called *maquiladoras*², along Mexico's 2,000-mile northern border. As of January 2002 there were 3,367 *maquiladoras* employing 1,071,710 workers (INEGI, 2002). It is clear that the *maquiladora* industry was engaged in competition, in U.S. product markets, well before the beginnings of Mexican trade liberalization in the mid 1980s.

As regards gender discrimination, the female-male earnings ratio in urban Mexico was 0.7921 in 1987; it fell to 0.7501 by 1991, but rose thereafter, reaching 0.7803 by 1993 (Brown et al., 1999). Further, Brown et al. (1999) attribute most of this male-female earnings differential to differences in rewards to endowments than to gender differences in endowments. Thus, it is evident there is substantial gender discrimination in Mexican labor markets.

Given the extent of gender discrimination in Mexico and the nation's rapid transition from a closed to an open economy, an inverse relation between trade-induced product market competition and labor market discrimination might be adequately tested upon Mexican labor data.

IV. The Empirical Methodology

Whether improved competition in product markets reduces discrimination in labor markets is testable upon Mexican labor data in the following three ways.

¹The *bracero* program was instituted on August 4, 1942, to alleviate a manual labor shortage in the U.S. on account of the war.

²The term derives from the Spanish verb *maquilar*, which means 'to put together or assemble'.

First, the export-orientation of the *maquiladora* sector implies that it has historically faced relatively more product market competition than the rest of the Mexican economy. Therefore, if it were found that the gender earnings gap has been smaller in *maquiladoras* than in the rest of urban Mexican, an inverse relation between trade-induced product market competition and labor market discrimination might be construed. This is a ‘differences’ approach to testing the hypothesis.

Second, as discussed, almost the entire Mexican economy has become more open, hence subject to competition, since the mid 1980s, particularly since the advent of NAFTA in 1994. Thus, if it were found that the gender earnings gap has narrowed more rapidly, since trade liberalization, in the non-*maquiladora* than in the *maquiladora* sector, the latter having plausibly been subject to competition all along, an inverse relation between trade-induced product market competition and labor market discrimination might be inferred. This is a ‘difference in differences’ approach to testing the hypothesis akin to Blackís and Brainerd’s (2000) strategy.

Third, tariff elimination under NAFTA has been a phased process with tariffs falling faster in some sectors than in others, and with certain sectors³ entirely exempt from the elimination of tariffs. This constitutes a kind of natural experiment for testing the hypothesis of a negative relation between trade-induced competition in product markets and labor market discrimination. If it were found that the narrowing of the gender wage gap has proceeded more rapidly in non-*maquiladora*⁴ sub-sectors experiencing faster reduction in tariffs under NAFTA, it might be concluded that foreign trade reduces labor market discrimination. This too is a ‘difference in differences’ approach to testing the hypothesis.

A. A Higher Female-male Earnings Ratio (Lower Male-female Earnings Gap) In *Maquiladoras*

Assume that a worker’s log earnings is a linear function of, among others, the logarithm of hours worked, employment in the *maquiladora* sector, and gender, with the effect of gender differing by sector of employment. The logarithm of hours worked is included as an explanatory variable in lieu of the use of log *hourly*

³These include supply-managed goods (dairy, poultry, eggs) and several items of sugar. Further, certain sectors, often dominated by state owned natural monopolies, such as petroleum and power generation did not even fall within the purview of NAFTA.

⁴Increased competition from imports following tariff reduction under NAFTA is irrelevant to the export-oriented *maquiladora* sector.

earnings as the dependent variable so as not to restrict the work-hours elasticity of earnings to unity. Hence, let

$$\ln I = a_1 + a_2 \cdot \ln H + a_3 \cdot M + a_4 \cdot F + a_5 \cdot F \cdot M + X' a_6 + u \quad (1)$$

represent the earnings function, where I denotes earnings, M is an indicator variable such that $M = 1$ if the worker is employed in a *maquiladora*, $M = 0$ otherwise, $F = 1$ if the worker is female, $F = 0$ otherwise, vector X includes such variables as educational attainment, work experience, marital status, occupation, industry of employment, and region of residence, and u signifies the regression error. Thus, the ratio of the predicted earnings of a female worker to that of a comparable male worker in the non-*maquiladora* sector may be calculated as $e^{\hat{a}_4}$, where \hat{a}_4 denotes the ordinary least squares (OLS) estimate of \hat{a}_4 in (1). On the other hand, the ratio of the predicted earnings of a female worker to that of a comparable male worker in the *maquiladora* sector may be calculated as $e^{\hat{a}_4}$. Consequently, if the estimated coefficient of the interaction FM were found to be positive and the variable significant, it may be concluded that the female-male earnings ratio has been higher in the *maquiladora* sector than in the rest of urban Mexico.

B. Greater Increase of the Female-male Earnings Ratio in the Non-*maquiladora* Sector Than in the *Maquiladora* Sector Since Trade Liberalization

Consider two time periods, t_1 and t_2 , such that t_1 predates full trade liberalization whereas t_2 is in the post-liberalization era. Then, whether the female-male earnings ratio has increased more rapidly, since trade liberalization, in the non-*maquiladora* sector than in the *maquiladora* sector may be tested via estimation of the earnings function

$$\begin{aligned} \ln I = & b_1 + b_2 \cdot \ln H + b_3 \cdot T + b_4 \cdot M + b_5 \cdot M \cdot T + b_6 \cdot F \\ & + b_7 \cdot F \cdot T + b_8 \cdot F \cdot M + b_9 \cdot F \cdot M \cdot T + X' b_{10} + u \end{aligned} \quad (2)$$

where $T = 1$ if the time period is t_2 , $T = 0$ otherwise, $M = 1$ if, as before, the worker is a *maquiladora* employee, $M = 0$ otherwise, and, as before, $F = 1$ if the worker is female, $F = 0$ otherwise. By (2), the ratio of the predicted earnings of a female worker to that of a comparable male worker in the non-*maquiladora* sector equals $e^{\hat{b}_6}$ prior to full trade liberalization, and $e^{\hat{b}_6 + \hat{b}_7}$ in the post-liberalization era. Thus, the inter-temporal percentage increase of the female-male earnings ratio in the non-*maquiladora* sector may be estimated to be $(e^{\hat{b}_7} - 1) \times 100$. Similarly, the

percentage increase, in the period t_1 to t_2 , of the female-male earnings ratio in the *maquiladora* sector may be estimated to be $(e^{\hat{b}_7 + \hat{b}_9} - 1) \times 100$. Therefore, the estimated inter-temporal percentage increase in the female-male earnings ratio will have been greater in the non-*maquiladora* sector than in the *maquiladora* sector if $\hat{b}_7 > \hat{b}_7 + \hat{b}_9$, or, equivalently, if $\hat{b}_9 < 0$. Thus, if the estimated coefficient of the interaction $F.M.T$ in (2) were found to be negative and the variable significant, it may be concluded that there has been greater increase, in proportionate terms, of the female-male earnings ratio in the non-*maquiladora* sector than in the *maquiladora* sector since trade liberalization.

C. Greater Increase of the Female-male Earnings Ratio in Non-*maquiladora* Sub-Sectors with Faster Tariff Reduction Under NAFTA

Once again, consider two time periods, t_1 and t_2 , such that t_1 predates the implementation of NAFTA whereas t_2 postdates it. Further, divide the non-*maquiladora* sector into two sub-sectors such that tariffs are entirely eliminated by period t_2 in one but not the other. Then, whether the female-male earnings ratio has increased more rapidly, since trade liberalization, in the non-*maquiladora* sub-sector with faster tariff reduction under NAFTA may be tested via estimation, upon data restricted to the non-*maquiladora* sector, of the earnings function

$$\ln I = c_1 + c_2 \cdot \ln H + c_3 \cdot T + c_4 \cdot N \cdot T + c_5 \cdot F + c_6 \cdot F \cdot T + c_7 \cdot F \cdot N \cdot T + X'c_8 + u \quad (3)$$

where, as before, $T = 1$ if the time period is t_2 , $T = 0$ otherwise, $N = 1$ if the worker is employed in the non-*maquiladora* sub-sector with less than a 100% reduction in tariffs, i.e., with slower tariff reduction, $N = 0$ otherwise, and, as before, $F = 1$ if the worker is female, $F = 0$ otherwise. Note that the variable N and the interaction $F.N$ are excluded as regressors since the non-*maquiladora* sector may be considered homogenous in period t_1 , i.e., prior to the implementation of NAFTA. Only in period t_2 might a distinction be drawn between the non-*maquiladora* sub-sectors with, respectively, slow and fast tariff reductions under NAFTA. On the other hand, it is plausible the two sub-sectors were different even prior to NAFTA, so that (3) ignores important sectoral effects. This may be remedied by modifying (3) as

$$\begin{aligned} \ln I = c_1 + c_2 \cdot \ln H + c_3 \cdot T + c_4 \cdot M + c_5 \cdot M \cdot T + c_6 \cdot F + \\ + c_7 \cdot F \cdot T + c_8 \cdot F \cdot N + c_9 \cdot F \cdot N \cdot T + X'c_{10} + u \end{aligned} \quad (4)$$

i.e., by including N and $F.N$ as regressors. By a logic similar to that employed in section 4.2, if the estimated coefficient of the interaction $F.N.T$ in (3) or (4) were

found to be negative and the variable significant, it may be concluded that there has been greater increase, in proportionate terms, of the female-male earnings ratio in the non-*maquiladora* sub-sector with faster tariff reduction under NAFTA.

D. The Analyses Combined

Whether the female-male earnings ratio has been higher in the *maquiladora* sector than in the rest of urban Mexico, whether this ratio has increased more rapidly in the non-*maquiladora* sector since trade liberalization, and whether, within the non-*maquiladora* sector, the ratio has risen more rapidly in the sub-sector with faster tariff reduction under NAFTA, may also be tested via estimation of the single equation

$$\begin{aligned} \ln I = & d_1 + d_2 \cdot \ln H + d_3 \cdot T + d_4 \cdot M + d_5 \cdot N + c_6 \cdot F + \\ & + d_7 \cdot M \cdot T + d_8 \cdot N \cdot T + d_9 \cdot F \cdot T + d_{10} \cdot F \cdot M + d_{11} \cdot F \cdot N \\ & + d_{12} \cdot F \cdot M \cdot T + d_{13} \cdot F \cdot N \cdot T + X' d_{14} + u \end{aligned} \quad (5)$$

E.g., the predicted female-male earnings ratios in the *maquiladora* sector in the periods t_1 and t_2 may be calculated as, respectively, $e^{\hat{d}_7 + \hat{d}_{10}}$ and $e^{\hat{d}_6 + \hat{d}_9 + \hat{d}_{10} + \hat{d}_{12}}$, to be compared with the analogous ratios in the two non-*maquiladora* sub-sectors to discover whether the female-male earnings differential has been narrower in the *maquiladora* sector.

V. The Data and Empirical Results

Data for this study are drawn from the Encuesta Nacional de Empleo Urbano (ENEU) or National Urban Employment Survey. The ENEU provides a quarterly data series rich in socio-economic information. The survey samples about 60% of the nation's urban population including about 90% of the population in areas with 100,000 or more inhabitants. This study's findings are, therefore, likely to be highly pertinent to the entire Mexican urban labor force.

Table 2 presents the full definitions of the variables included in the analyses. Table 3 presents the sample means of these variables. Column 1 presents sample means pertaining to the full sample of workers, numbering 203,550, upon which (1) and (2) are estimated. Column 2 presents sample means pertaining to the sub-sample of non-*maquiladora* workers, numbering 196,550, upon which (3) and (4) are estimated. Recall that (3) and (4) are estimated upon this sub-sample because increased import competition following tariff reduction under NAFTA is irrelevant

Table 2. Definitions of Variables

Log Earnings	= natural logarithm of monthly earnings in 1999 pesos
Log Hours	= natural logarithm of hours worked during week prior to interview
Schooling	= years of formal education
Experience	= years of work experience calculated as age - years of formal education - 6
Married	= 1 if married, 0 otherwise
Formal Sector	= 1 if employed in the formal sector (legally established business), 0 otherwise
Owner	= 1 if the individual is an entrepreneur
Female	= 1 if female, 0 otherwise
Maquila	= 1 if employed in the <i>maquiladora</i> sector, 0 otherwise
Year 1999	= 1 if drawn from the 1999 ENEU, 0 if drawn from the 1987 ENEU
Slow Liberalization	= 1 if employed in non- <i>maquiladora</i> sub-sector with less than a 100% tariff reduction by 1999, 0 otherwise
Female×Year 1999	= interaction of Female and Year 1999
Maquila×Year 1999	= interaction of Maquila and Year 1999
Slow Liberalization×Year 1999	= interaction of Slow Liberalization and Year 1999
Female×Slow Liberalization	= interaction of Female and Slow Liberalization
Key Variables:	
Female×Maquila	= interaction of Female and Maquila
Female×Maquila×Year 1999	= interaction of Female, Maquila, and Year 1999
Female×Slow Liberalization×Year 1999	= interaction of Female, Slow Liberalization, and Year 1999
Industry: Omitted Category = Service Sector	
Farm	= 1 if employed in agricultural sector, including agro-based industry; 0 otherwise
Mine or Electric	= 1 if employed in mining or power sectors, 0 otherwise
Manufacturing	= 1 if employed in the manufacturing sector, 0 otherwise
Construction	= 1 if employed in the construction sector, 0 otherwise
Commerce	= 1 if employed in the commerce sector; 0 otherwise
Occupation: Omitted Category = Occupation of Laborer	
Professional	= 1 if a professional, 0 otherwise
Technical	= 1 if a technician, 0 otherwise
Managerial	= 1 if a manager, 0 otherwise
Firm Size: Omitted Category = single employee firm	
Micro	= 1 if employed in firm with 1-5 employees, 0 otherwise
Small	= 1 if employed in firm with 6-50 employees, 0 otherwise
Medium	= 1 if employed in firm with 51-250 employees, 0 otherwise
Large	= 1 if employed in firm with more than 250 employees, 0 otherwise
Region of Residence: Omitted Category = Central Region	
Border	= 1 if lives on the Mexico-U.S. border, 0 otherwise
North	= 1 if lives in a northern state of Mexico excluding the border, 0 otherwise
South	= 1 if lives in a southern state of Mexico, 0 otherwise

Table 3. Sample Statistics

	(1)	(2)	(3)
	Full Sample	Only Non- <i>Maquiladora</i>	Only <i>Maquiladora</i>
Variable	Mean	Mean	Mean
Log Earnings	7.355	7.335	7.898
Log Hours	3.718	3.717	3.762
Schooling	9.340	9.365	8.649
Experience	18.229	18.402	13.392
Married	0.600	0.603	0.511
Formal Sector	0.791	0.783	1.000
Owner	0.257	0.266	0.004
Female	0.375	0.371	0.490
Maquila	0.034		1.000
Year 1999	0.793	0.795	0.737
Female×Year 1999	0.308	0.306	0.347
Maquila×Year 1999	0.025		0.737
Slow Liberalization×Year 1999	0.079	0.082	
Female×Slow Liberalization	0.028	0.029	
Key Variables:			
Female×Maquila	0.017		0.490
Female×Maquila×Year 1999	0.012		0.347
Female×Slow Liberalization×Year 1999	0.022	0.022	
Industry: Omitted Category = Service Sector			
Farm	0.016	0.017	
Mine or Electric	0.013	0.014	
Manufacturing	0.227	0.200	1.000
Construction	0.058	0.060	
Commerce	0.200	0.207	
Occupation: Omitted Category = Occupation of Laborer			
Professional	0.096	0.098	0.030
Technical	0.042	0.042	0.032
Managerial	0.115	0.114	0.158
Firm Size: Omitted Category = single employee firm			
Micro	0.250	0.259	
Small	0.177	0.183	
Medium	0.070	0.068	0.111
Large	0.354	0.335	0.889
Region of Residence: Omitted Category = Central Region			
Border	0.124	0.092	1.000
North	0.399	0.377	1.000
South	0.141	0.146	
n =	203,550	196,550	7000

to the export-oriented *maquiladora* sector engaged in competition in U.S. product markets since the mid 1960s. Column 3 presents sample means pertaining to the sub-sample of *maquiladora* workers if only for the purposes of comparison with the sample means in column 2. By the statistics in column 1, 79.3% of the 203,550 workers in the full sample are drawn from the 1999 ENEU with the remainder coming from the 1987 round of the survey. 37.5% of the full sample consists of female workers. *Maquiladora* workers constitute 3.4% of the full sample. Female *maquiladora* workers make up 1.7% of the full sample, implying about half of *maquiladora* workers are women. Although the ENEU is an urban survey, 1.6% of the full sample of workers is affiliated to the agricultural sector (farm industry). It is likely these are landowners who reside in cities or workers in agro-based industries.

Table 4 presents OLS estimates of (1). Vector X is taken to consist of measures of human capital (Schooling and Experience), marital status (Married), employment in the formal sector (Formal Sector, since regional minimum wage laws may be flouted in the informal sector), entrepreneurship (Owner, to capture market compensation for the bearing of business risk), industrial and occupational affiliation, employer size, and geographical region of residence. A dummy variable indicating time period (Year 1999) is also included in vector X . By these estimates, the ratio of the predicted monthly earnings of a female worker to that of a strictly comparable male worker in the non-*maquiladora* sector is $e^{-0.325} = 0.723$. In other words, a female worker earns 27.7% less on average than a comparable male worker in the non-*maquiladora* sector. On the other hand, the ratio of the predicted earnings of a female worker to that of a comparable male worker in the *maquiladora* sector is $e^{-0.325+0.195} = 0.878$. In other words, a female worker earns only 12.2% less on average than a comparable male worker in the *maquiladora* sector. This is a statistically significant difference given the interaction Female \times Maquila is significant at the 1% level.

It is notable that *maquiladora* workers, both male and female, earn 25.2% less on average than comparable workers in other sectors of the economy. Lower earnings in the export-oriented *maquiladora* sector are consistent with arguments (e.g., Weston, 1999) that competition in global markets is linked to the low and falling living standards of workers in the export sectors of developing nations as employers are driven to cut costs.

There are a number of other notable subsidiary findings. *Ceteris paribus*, real earnings were 19.83% lower in 1999 than in 1987. Returns to entrepreneurship

Table 4. A Comparison of the Gender Earnings Differential Between the *Maquiladora* and Non-*Maquiladora* Sectors OLS Estimates, Dependent Variable =Log Earnings (ln *I*)

Variable	Coefficient	T-ratio
Constant	2.499	77.692
Log Hours (ln <i>H</i>)	1.030	133.310
Schooling	0.036	39.246
Experience	0.005	17.357
Married	0.067	9.837
Formal Sector	0.040	3.806
Owner	1.079	111.587
Female (<i>F</i>)	-0.325	-47.068
Maquila (<i>M</i>)	-0.290	-11.062
Year 1999	-0.221	-28.989
Key Variable:		
Female×Maquila (<i>FM</i>)	0.195	5.893
Industry:		
Farm	-1.328	-53.074
Mine or Electric	0.094	3.541
Manufacturing	-0.227	-26.557
Construction	0.139	9.897
Commerce	-0.679	-79.514
Occupation:		
Professional	0.611	50.104
Technical	0.307	19.941
Managerial	0.570	54.013
Firm Size:		
Micro	-0.454	-38.368
Small	0.799	54.317
Medium	1.021	57.396
Large	1.164	79.279
Region of Residence:		
Border	0.384	32.885
North	0.159	21.979
South	-0.058	-6.292
R^2		0.357
n =		203,550

Note: All regressors are significant at the 1% level.

appear high in urban Mexico in that the ratio of the predicted earnings of an owner/entrepreneur to that of a comparable employee is 2.942. The rate of return to schooling is estimated at 3.6%, and that to work experience, at 0.5%. It appears married workers earn significantly more than single workers. As anticipated, earnings are significantly higher in the formal sector than in the informal sector.

Table 5. A Comparison of Inter-Temporal Change in the Gender Earnings Differential Between the *Maquiladora* and Non-*Maquiladora* Sectors OLS Estimates, Dependent Variable=Log Earnings (ln *I*)

Variable	Coefficient	T-ratio
Constant	2.508	77.499
Log Hours (ln <i>H</i>)	1.030	133.331
Schooling	0.036	39.236
Experience	0.005	17.348
Married	0.066	9.746
Formal Sector	0.040	3.830
Owner	1.080	111.564
Female (<i>F</i>)	-0.360	-24.396
Maquila (<i>M</i>)	-0.333	-6.825
Year 1999 (<i>T</i>)	-0.235	-24.825
Female×Year 1999 (<i>F.T</i>)	0.043	2.675
Maquila×Year 1999 (<i>M.T</i>)	0.058	1.063
Female×Maquila (<i>F.M</i>)	0.317	4.885
Key Variable:		
Female×Maquila×Year 1999 (<i>F.M.T</i>)	-0.163	-2.169
Industry:		
Farm	-1.328	-53.080
Mine or Electric	0.094	3.525
Manufacturing	-0.228	-26.599
Construction	0.139	9.911
Commerce	-0.679	-79.550
Occupation:		
Professional	0.610	50.103
Technical	0.308	19.976
Managerial	0.570	54.005
Firm Size:		
Micro	-0.453	-38.179
Small	0.800	54.379
Medium	1.022	57.452
Large	1.165	79.320
Region of Residence:		
Border	0.384	32.866
North	0.159	21.973
South	-0.058	-6.309
R ²		0.357
n =		203,550

Note: All regressors save Maquila×Year 1999 and FemaleMaquila×Year 1999 are significant at the 1% level. Female×Maquila×Year 1999 is significant at the 5% level. Maquila×Year 1999 is insignificant.

Table 5 presents OLS estimates of (2). Time periods t_1 and t_2 are taken to be the years 1987 and 1999, respectively. Given Mexico enrolled in the GATT only in

1986, it is accurate to say the nation was only beginning to liberalize imports in 1987. On the other hand, given NAFTA became effective in 1994, 1999 may be considered to be in the post-liberalization era. Vector X is, as before, taken to consist of measures of human capital, marital status, employment in the formal sector, entrepreneurship, industrial and occupational affiliation, employer size, and geographical region of residence. The estimated coefficients of these regressors are not dissimilar in sign and magnitude to their counterparts in Table 4.

The estimates in Table 5 indicate that the female-male earnings ratio in the non-*maquiladora* sector increased by 4.394%⁵ between 1987 and 1999. In contrast, the female-male earnings ratio in the *maquiladora* sector actually decreased by 11.308% in the same period, though yet remaining higher than in the non-*maquiladora* sector. This is a statistically significant difference given the interaction Female×Maquila×Year 1999 is significant at the 5% level. It may be construed as evidence that increased competition from imports since the liberalization of trade has played a role in reducing the gender earnings gap in sectors of the urban economy subjected to such competition, since the gap appears instead to have widened in the sector not subjected to import competition, namely, the export-oriented *maquiladora* sector.

Table 6 presents OLS estimates of (3) and (4). As before, vector X is considered to include measures of human capital, marital status, employment in the formal sector, entrepreneurship, industrial and occupational affiliation, employer size, and geographical region of residence. The estimated coefficients of these regressors are similar in sign and magnitude to their counterparts in tables 4 and 5. By the estimates in the first two columns of table 6, pertaining to (3), the female-male earnings ratio increased by 5.654% during 1987-1999 in the non-*maquiladora* sub-sector with 100% reduction in tariffs. In contrast, the female-male earnings ratio actually decreased by 13.151% in the non-*maquiladora* sub-sector with less than complete elimination of import duties. This is a statistically significant difference given that the interaction Female×Slow Liberalization×Year 1999 is significant at the 1% level. Similarly, by the estimates in the third and fourth columns of table 6, pertaining to (4), the female-male earnings ratio increased by 4.603% during 1987-1999 in the non-*maquiladora* sub-sector with 100% reduction in tariffs. On the other hand, this ratio decreased by 3.921% in the non-*maquiladora* sub-sector with less than complete elimination of tariffs. This too is

⁵ $(e^{0.043} - 1) \times 100$

Table 6. A Comparison of Inter-Temporal Change in the Gender Earnings Differential Between the Non-*Maquiladora* Sub-Sectors with Fast and Slow Tariff Reduction OLS Estimates, Dependent Variable=Log Earnings (ln *I*)

Variable	Coefficient	T-ratio	Coefficient	T-ratio
Constant	2.493	75.504	2.495	75.290
Log Hours (ln <i>H</i>)	1.033	131.326	1.033	131.350
Schooling	0.035	37.211	0.035	37.200
Experience	0.005	16.287	0.005	16.270
Married	0.065	9.136	0.065	9.140
Formal Sector	0.039	3.704	0.040	3.780
Owner	1.083	109.798	1.083	109.780
Female (<i>F</i>)	-0.355	-23.704	-0.345	-21.510
Year 1999 (<i>T</i>)	-0.227	-23.092	-0.232	-22.200
Slow Liberalization (<i>N</i>)			-0.038	-1.630
Female×Year 1999 (<i>F.T</i>)	0.055	3.321	0.045	2.560
Slow Liberalization×Year 1999 (<i>N.T</i>)	-0.042	-2.687	-0.014	-0.560
Female×Slow Liberalization			-0.111	-2.47
Key Variable:				
Female×Slow Liberalization×Year 1999 (<i>F.N.T</i>)	-0.196	-7.669	-0.085	-1.65
Industry:				
Farm	-1.310	-50.497	-1.299	-49.460
Mine or Electric	0.116	4.235	0.124	4.520
Manufacturing	-0.191	-18.975	-0.179	-16.580
Construction	0.143	10.032	0.144	10.110
Commerce	-0.683	-78.588	-0.683	-78.580
Occupation:				
Professional	0.613	49.113	0.612	49.070
Technical	0.306	19.271	0.305	19.240
Managerial	0.585	53.034	0.584	52.990
Firm Size:				
Micro	-0.449	-37.272	-0.450	-37.29
Small	0.804	53.756	0.804	53.740
Medium	1.020	55.814	1.020	55.840
Large	1.173	78.438	1.173	78.460
Region of Residence:				
Border	0.385	32.448	0.385	32.370
North	0.158	21.490	0.158	21.42
South	-0.059	-6.320	-0.059	-6.330
<i>R</i> ²	0.355		0.355	
n =	196550		196550	

Note: All regressors save Slow Liberalization×Year 1999 and Female×Slow Liberalization×Year 1999 are significant at the 1% level. Female×Slow Liberalization×Year 1999 is significant at the 10% level. Slow Liberalization×Year 1999 is insignificant.

Table 7. The Analyses Combined OLS Estimates, Dependent Variable=Log Earnings (ln *I*)

Variable	Coefficient	T-ratio
Constant	2.493	77.660
Log Hours (ln <i>H</i>)	1.031	133.510
Schooling	0.036	39.200
Experience	0.005	17.250
Married	0.066	9.730
Formal Sector	0.041	3.890
Owner	1.082	111.770
Female (<i>F</i>)	-0.345	-21.870
Maquila (<i>M</i>)	-0.375	-7.610
Slow Liberalization (N)	-0.038	-1.660**
Year 1999 (<i>T</i>)	-0.233	-22.610
Female×Year 1999 (<i>F.T</i>)	0.045	2.590
Maquila×Year 1999 (<i>M.T</i>)	0.055	1.020*
Slow Liberalization×Year99 (N.T)	-0.013	-0.520*
Female×Maquila (<i>F.M</i>)	0.302	4.630
Female×Slow Liberalization (F.N)	-0.111	-2.500
Female×Maquila×Year 1999 (<i>F.M.T</i>)	-0.165	-2.180
Female×Slow Liberalization×Year 1999 (<i>F.N.T</i>)	-0.086	-1.690**
Farm	-1.290	-50.010
Mine or Electric	0.125	4.620
Manufacturing	-0.178	-16.760
Construction	0.145	10.330
Commerce	-0.680	-79.660
Professional	0.609	49.990
Technical	0.306	19.870
Managerial	0.570	53.920
Micro	-0.450	-37.920
Small	0.802	54.550
Medium	1.025	57.600
Large	1.170	79.590
Border	0.385	32.890
North	0.158	21.780
South	-0.059	-6.420
R^2		0.358
n =		203,550

Note: With the exceptions of the variables Slow Liberalization, Maquila×Year99, Slow Liberalization ×Year99, and Female×Slow Liberalization×Year99, all variables are significant at the 1% level. Of these exceptions, the first and last are significant at the 10% level, whereas the remaining two are insignificant.

a statistically significant inter-sub-sectoral difference given that the interaction Female×Slow Liberalization×Year 1999 is significant at the 10% level. In other words, a narrowing of the male-female earnings gap in the non-*maquiladora*

sector since the advent of NAFTA appears restricted to the sub-sector in which tariffs were completely eliminated by 1999. As argued, this may be interpreted as evidence that trade liberalization has played a role in reducing gender discrimination in urban Mexican labor markets.

Table 7 presents OLS estimates of (5). They indicate that the female-male earnings ratio was 0.956 in the *maquiladora* sector in 1987 as compared to 0.708 and 0.634 in the non-*maquiladora* sub-sectors with, respectively, faster and slower reduction in tariffs under NAFTA. Similarly, this ratio was 0.850 in the *maquiladora* sector in 1999 as compared to 0.741 and 0.608 in the non-*maquiladora* sub-sectors with, respectively, faster and slower reduction in tariffs under NAFTA. In other words, the male-female earnings gap appears to have been narrower in the export oriented *maquiladora* sector than in the rest of urban Mexico, suggesting trade-induced product market competition reduces gender discrimination in labor markets. Further, these estimates indicate the female-male earnings ratio decreased by 11.308%, i.e., the gender earnings gap widened, in the *maquiladora* sector between 1987 and 1999. On the other hand, it is indicated this ratio increased by 4.603% in the non-*maquiladora* sub-sector with faster reduction in tariffs under NAFTA. In contrast, the female-male earnings ratio appears to have decreased by 4.017% in the non-*maquiladora* sub-sector with slower reduction in tariffs. In other words, narrowing of the male-female earnings gap appears to have been confined to the non-*maquiladora* sub-sector with a 100% reduction in tariffs by 1999. This suggests trade liberalization may reduce employment gender discrimination.

VI. Gender and Trade

The United Nations Development Fund for Women (UNIFEM), among others, opines that trade liberalization has diminished the livelihoods of large sections of women in less developed countries. It is argued that female employment in low-income countries is concentrated in small and medium scale industries, often in the informal sector. These are particularly vulnerable to import and export competition from trade liberalization. Further, many export industries have favored the hiring of women with the result that employment in export-oriented manufacturing production has tended to become feminized. Hence, it is held that trade liberalization has increased competition between women in different low-income countries, with the result that their wages and working conditions have

deteriorated. It is contended, for example, that women in many developing country export industries are increasingly driven to accept unconventional and poorer paying forms of employment in the informal sector, such as home-production.

Evidence of a negative relation between trade liberalization and the gender earnings differential in urban Mexico is relevant to this bleak view of gender and trade. The widespread deterioration of women's living standards would be consistent with a general narrowing of the gender earnings gap only if women were concentrated in sectors of the economy particularly vulnerable to import and export competition⁶. Given that the liberalization of trade will gain momentum under the WTO agreement, this paper's findings suggest that the livelihoods of women in low-income countries might be protected only if such sectoral concentration of female workers were prevented.

VII. Conclusion

This paper examines the effect of past trade liberalization on workplace gender discrimination in urban Mexico. It uncovers evidence that trade-induced product market competition is associated with a higher female-male earnings ratio i.e., with a lower gender earnings gap. This suggests that the WTO agreement will lead to reduction of workplace gender discrimination in low-income countries.

Specifically, this paper finds that the female-male earnings ratio is significantly higher in the export-oriented *maquiladora* sector than in the rest of urban Mexico. Since the *maquiladora* sector has long been engaged in competition in U.S. product markets, this suggests trade-induced product market competition reduces labor market discrimination. Next, it is found that decline in the gender earnings gap between 1987 and 1999, a period of rapid trade liberalization, is confined to the non-*maquiladora* sector. Indeed, the female-male earnings ratio decreased in the *maquiladora* sector, though yet remaining higher than in the non-*maquiladora* sector. Since the *maquiladora* sector, by its export orientation, is unaffected by import competition, the fact that decline in the gender earnings differential is restricted to the non-*maquiladora* sector suggests that reduction in import tariffs had a role to play. Lastly, this study finds that, within the non-*maquiladora* sector, decline in the gender earnings gap between 1987 and 1999 is confined to the sub-

⁶Since women must make absolute gains in the sectors seeing improvement in wages and working conditions

sector experiencing an elimination of import tariffs. In fact, the female-male earnings ratio decreased in the sub-sector with less than a 100% tariff reduction. This suggests that the elimination of import tariffs potentially reduces workplace gender discrimination.

This paper's findings may be taken as support for Becker's (1957) thesis of a negative relation between product market competition and labor market discrimination. They also imply that the WTO agreement has potential to improve the relative economic status of women in low-income countries. Finally, the findings imply that deterioration, in absolute terms, of the livelihoods of large sections of women in the developing world must be due to their overrepresentation in economic sectors particularly vulnerable to import and export competition.

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