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Foreign Trade and the Gender Earnings Differential in Urban Mexico

Gautam Hazarika and Rafael Otero*

December 2002

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 four decades ago, Becker argued that labour 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 more likely to discriminate. It therefore follows that competition in product markets may reduce discrimination in labour 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 does find 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*).

Keywords: gender discrimination, trade liberalization, Mexico

JEL classification: F14, J16, J70

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1 Introduction

While it is agreed that 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 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 that trade liberalization has diminished the livelihoods of women in many low-income countries (e.g. Wee 1998).

This paper argues that trade liberalization may improve the *relative* economic status of women in low-income countries and 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 labour 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 2 discusses the effect of product market competition, always intensified by trade liberalization, on labour market discrimination; Section 3 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 4 describes the empirical methodology used to uncover the effect of trade liberalization upon the gender earnings differential; Section 5 describes the data upon which the empirical analyses are based, and presents ensuing statistical evidence and related discussion; Section 6 summarizes these findings and briefly concludes.

2 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 labour 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 six per cent of output is lost. Using plant-level and firm-level data to examine the relation between profits and female employment, Hellerstein et al. (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 US, 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 US were far from racially integrated.

There is also growing evidence that improved competition in product markets reduces discrimination in labour markets. In an influential study of the US 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 yet another study of the US 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 US 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.

3 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 enrolment 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)	17 December 1992	1 January 1994
Mexico - Costa Rica	5 April 1994	1 January 1995
Mexico - Colombia, and Venezuela (G3 - Group of Three)	13 June 1994	1 January 1995
Mexico – Bolivia	10 September 1994	1 January 1995
Mexico – Nicaragua	18 December 1997	1 July 1998
Mexico – Chile	17 April 1998	1 August 1999
Mexico - European Union	24 February 2000	1 July 2000
Mexico – Israel	10 April 2000	1 July 2000
Mexico - El Salvador, Honduras, and Guatemala (Northern Triangle)	29 June 2000	1 April 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 Programme. This new programme was intended to combat unemployment in the border region as a result of the US's termination of the *bracero* programme¹ in 1964. This industrialization programme 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 labour, 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 US and US 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 US 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 US 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 labour markets.

¹ The *bracero* programme was instituted on 4 August 1942, to alleviate a manual labour shortage in the US on account of the war.

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

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 labour market discrimination might be adequately tested upon Mexican labour data.

4 The empirical methodology

Whether improved competition in product markets reduces discrimination in labour markets is testable upon Mexican labour data in the following three ways. 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 Mexico, an inverse relation between trade-induced product market competition and labour 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 labour market discrimination might be inferred. This is a 'difference in differences' approach to testing the hypothesis akin to Black's 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 labour 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 labour market discrimination. This too is a 'difference in differences' approach to testing the hypothesis.

³ These 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.

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

A higher female-male earnings ratio (lower male-female earnings gap) in *maquiladoras*

Assume that log earnings of a male worker is a linear function of, among others, employment in the *maquiladora* sector and the logarithm of hours worked. The logarithm of hours worked is included as a regressor in lieu of the use of log *hourly* earnings as the dependent variable so as not to restrict the work hours elasticity of earnings to one. Hence, let

$$(1) \quad \ln I = a_1 + b_1.M + c.\ln H + X'd + u$$

describe the log earnings of a male worker, where I represents earnings, M is an indicator variable such that $M = 1$ if the worker is employed in a *maquiladora*, $M = 0$ otherwise, $\ln H$ denotes the log of hours worked, 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. Similarly, let

$$(2) \quad \ln I = a_2 + b_2.M + c.\ln H + X'd + u$$

describe the log earnings of a female worker. (1) and (2) may be combined as

$$(3) \quad \ln I = a_1 + (a_2 - a_1).F + b_1.M + (b_2 - b_1).F.M + c.\ln H + X'd + u,$$

where $F = 1$ if the worker is female, $F = 0$ otherwise. Hence, 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 $e^{\hat{a}_2 - \hat{a}_1}$, where $\hat{a}_2 - \hat{a}_1$ denotes the ordinary least squares (OLS) estimate of the coefficient of F in (3). 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 $e^{(\hat{a}_2 - \hat{a}_1) + (\hat{b}_2 - \hat{b}_1)}$, where $\hat{b}_2 - \hat{b}_1$ denotes the OLS estimate of the coefficient of $F.M$ in (3). Thus, if the estimated coefficient of the interaction $F.M$ 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.

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. Let

$$(4) \quad \ln I = a_1 + b_1.F + c.\ln H + X'd + u$$

describe the log earnings of a non-*maquiladora* worker in period t_1 , where, as before, $F = 1$ if the worker is female, $F = 0$ otherwise. Similarly, let

$$(5) \quad \ln I = a_2 + b_2.F + c.\ln H + X'd + u$$

describe the log earnings of a *maquiladora* worker in period t_1 . Next, assume

$$(6) \quad \ln I = a_3 + b_3.F + c.\ln H + X'd + u.$$

describes the log earnings of a non-*maquiladora* worker in period t_2 . Similarly, assume

$$(7) \quad \ln I = a_4 + b_4.F + c.\ln H + X'd + u$$

describes the log earnings of a *maquiladora* worker in period t_2 .

By (4), the ratio of the earnings of a female worker to that of a comparable male worker in the non-*maquiladora* sector, prior to full trade liberalization, equals e^{b_1} . By (6), the ratio of the earnings of a female worker to that of a comparable male worker in the non-*maquiladora* sector, in the post liberalization regime, equals e^{b_3} . Thus, the inter-temporal percentage increase of the female-male earnings ratio in the non-*maquiladora* sector is $\left(\frac{e^{b_3}}{e^{b_1}} - 1\right) \times 100 = (e^{b_3-b_1} - 1) \times 100$.

Similarly, by (5), the ratio of the earnings of a female worker to that of a comparable male worker in the *maquiladora* sector, prior to full trade liberalization, equals e^{b_2} . Analogously, by (7), the ratio of the earnings of a female worker to that of a comparable male worker in the *maquiladora* sector, in the post liberalization regime, equals e^{b_4} . Therefore, the inter-temporal percentage increase of the female-male earnings ratio in the *maquiladora* sector is $\left(\frac{e^{b_4}}{e^{b_2}} - 1\right) \times 100 = (e^{b_4-b_2} - 1) \times 100$.

Hence, the percentage increase, from t_1 to t_2 , in the female-male earnings ratio will have been greater in the non-*maquiladora* sector than in the *maquiladora* sector if $b_3 - b_1 > b_4 - b_2$, or, equivalently, if $(b_4 - b_3) - (b_2 - b_1) < 0$. (4), (5), (6) and (7) may be combined as

$$(8) \quad \begin{aligned} \ln I = & a_1 + (a_3 - a_1).T + b_1.F + (b_3 - b_1)F.T \\ & + (a_2 - a_1).M + [(a_4 - a_3) - (a_2 - a_1)].M.T \\ & + (b_2 - b_1)F.M + [(b_4 - b_3) - (b_2 - b_1)].F.M.T \\ & + c.\ln H + X'd + u, \end{aligned}$$

where $T = 1$ if the time period is t_2 , $T = 0$ otherwise, and, as before, $M = 1$ if the worker is a *maquiladora* employee, $M = 0$ otherwise. Thus, if the estimated coefficient of the interaction $F.M.T$ in (8) 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.

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 full trade liberalization whereas t_2 is in the post-liberalization era. Let

$$(9) \quad \ln I = a_1 + b_1.F + c.\ln H + X'd + u$$

describe the log earnings of a non-*maquiladora* worker in period t_1 . Next, divide the non-*maquiladora* sector in period t_2 into two sub-sectors such that tariffs are entirely eliminated by period t_2 in one but not the other. Assume

$$(10) \quad \ln I = a_2 + b_2.F + c.\ln H + X'd + u$$

describes the log earnings in t_2 of a worker in the sub-sector with 100 per cent reduction in tariffs. Similarly, assume

$$(11) \quad \ln I = a_3 + b_3.F + c.\ln H + X'd + u$$

describes the log earnings in t_2 of a worker in the sub-sector with tariffs as yet in place. The percentage increase, from t_1 to t_2 , of the female-male earnings ratio in the non-*maquiladora* sub-sector with 100 per cent reduction in tariffs is, therefore, $(e^{b_2-b_1} - 1) \times 100$. On the other hand, the percentage increase, from t_1 to t_2 , of the female-male earnings ratio in the sub-sector with less than a 100 per cent reduction in tariffs is $(e^{b_3-b_1} - 1) \times 100$. Hence, there will have been greater increase of the female-male earnings ratio in the non-*maquiladora* sub-sector with faster tariff reduction if $b_2 > b_3$ or, equivalently, if $b_3 - b_2 < 0$.

(9), (10), and (11) may be combined as

$$(12) \quad \ln I = a_1 + (a_2 - a_1).T + (a_3 - a_2).N.T + b_1.F + (b_2 - b_1).F.T + (b_3 - b_2).F.N.T + c.\ln H + X'd + u,$$

where $N = 1$ if the worker is employed in the non-*maquiladora* sub-sector with less than a 100 per cent reduction in tariffs. Thus, if the estimated coefficient of the interaction $F.N.T$ in (12) 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.

5 The data and empirical results

Data for this study are drawn from the *Encuesta Nacional de Empleo Urbano* (ENEU).⁵ The ENEU provides a quarterly data series that is rich in socio-economic information. The survey samples about 60 per cent of the nation's urban population including about 90 per cent 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 labour 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 (3) and (8) are estimated. Column 2 presents sample means pertaining to the sub-sample of non-*maquiladora* workers, numbering 196,550, upon which (12) is estimated. Recall that (12) is estimated upon this sub-sample because increased import competition following tariff reduction under NAFTA is irrelevant to the export-oriented *maquiladora* sector engaged in competition in US product markets since the mid 1960s. By the statistics in column 1, 79.3 per cent 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 per cent of the full sample consists of female workers. *Maquiladora* workers constitute 3.4 per cent of the full sample. Female *maquiladora* workers make up 1.7 per cent of the full sample, implying about half of *maquiladora* workers are women. Although the ENEU is an urban survey, 1.6 per cent 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 (3). 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 per cent 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 per cent 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 per cent level.

⁵ National Urban Employment Survey.

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
	= 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
Key Variables:	
Female × Maquila	= interaction of Female and Maquila
Female × Maquila × Year 1999	= interaction of Female, Maquila, and Year 1999
<i>Female × Slow Liberalization ×</i> 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 Labourer	
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-US 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

Source: ENEU.

Table 3
Sample statistics

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

Source: ENEU.

Table 4
A comparison of gender earnings differentials in the
Maquiladora and non-*Maquiladora* sectors

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>F.M</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.

Source: ENEU.

Table 5
A comparison of inter-temporal changes in gender earnings differentials
between the *Maquiladora* and non-*Maquiladora* sectors

OLS Estimates, Dependent Variable = Log Earnings (ln L)

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 Female × Maquila × Year 1999 are significant at the 1% level. Female × Maquila × Year 1999 is significant at the 5% level. Maquila × Year 1999 is insignificant.

Source: ENEU.

It is notable that *maquiladora* workers, both male and female, earn 25.2 per cent⁶ 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 per cent⁷ lower in 1999 than in 1987. Returns to entrepreneurship appear high in urban Mexico in that the ratio of the predicted earnings of an owner/entrepreneur to that of a comparable employee is 2.942.⁸ The rate of return to schooling is estimated at 3.6 per cent, and that to work experience, at 0.5 per cent. It appears that 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 presents OLS estimates of (8). 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 per cent⁹ between 1987 and 1999. In contrast, the female-male earnings ratio in the *maquiladora* sector actually decreased by 11.308 per cent¹⁰ in the same period, though yet remaining higher than in the non-*maquiladora* sector. This is a statistically significant difference given the interaction Female \times Maquila \times Year 1999 is significant at the 5 per cent 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.

$$6 (1 - e^{-0.290}) \times 100$$

$$7 (1 - e^{-0.221}) \times 100$$

$$8 e^{1.079}$$

$$9 (e^{0.043} - 1) \times 100$$

$$10 (e^{0.043 - 0.163} - 1) \times 100$$

Table 6

A comparison of inter-temporal changes in gender earnings differentials
between non-*Maquiladora* sub-sectors with fast and slow tariff reduction

OLS estimates, dependent variable = log earnings (ln *L*)

Variable	Coefficient	T-ratio
Constant	2.493	75.504
Log Hours (ln <i>H</i>)	1.033	131.326
Schooling	0.035	37.211
Experience	0.005	16.287
Married	0.065	9.136
Formal Sector	0.039	3.704
Owner	1.083	109.798
Female (<i>F</i>)	-0.355	-23.704
Year 1999 (<i>T</i>)	-0.227	-23.092
Female × Year 1999 (<i>F.T</i>)	0.055	3.321
Slow liberalization × Year 1999 (<i>N.T</i>)	-0.042	-2.687
Key Variable:		
<i>Female</i> × <i>Slow Liberalization</i> × <i>Year 1999</i> (<i>F.N.T</i>)	-0.196	-7.669
Industry:		
Farm	-1.310	-50.497
Mine or electric	0.116	4.235
Manufacturing	-0.191	-18.975
Construction	0.143	10.032
Commerce	-0.683	-78.588
Occupation:		
Professional	0.613	49.113
Technical	0.306	19.271
Managerial	0.585	53.034
Firm Size:		
Micro	-0.449	-37.272
Small	0.804	53.756
Medium	1.020	55.814
Large	1.173	78.438
Region of Residence:		
Border	0.385	32.448
North	0.158	21.490
South	-0.059	-6.320
R^2		0.355
n =		196,550

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

Source: ENEU.

Table 6 presents OLS estimates of (12). 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 remaining estimates, the female-male earnings ratio increased by 5.654 per cent¹¹ during 1987–99 in the non-maquiladora sub-sector with 100 per cent reduction in tariffs. In contrast, the female-male earnings ratio actually decreased by 13.151 per cent¹² in the non-maquiladora sub-sector with less than complete elimination of import duties. This is a statistically significant difference given the interaction Female×Slow Liberalization×Year 1999 is significant at the one per cent 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 labour markets.

5.1 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 favoured 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 competition.¹³ 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.

11 $(e^{0.055} - 1) \times 100$

12 $(e^{0.055 - 0.196} - 1) \times 100$

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

6 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 US product markets, this suggests trade-induced product market competition reduces labour 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-sector experiencing an elimination of import tariffs. In fact, the female-male earnings ratio decreased in the sub-sector with less than a 100 per cent 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 labour 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.

References

- Ashenfelter, O. and T. Hannan (1986), 'Sex Discrimination and Product Market Competition: The Case of the Banking Industry', *Quarterly Journal of Economics*, Vol. 101, No. 1, February, pp. 149–73.
- Baerresen, D. W. (1971), *The Border Industrialization Program of Mexico*, Lexington MA: Heath Lexington Books.
- Becker, G. (1975), *The Economics of Discrimination*, Chicago: The University of Chicago Press.
- Black, S. and E. Brainerd (2000), 'Importing Inequality? The Impact of Globalization on Gender Discrimination', unpublished manuscript.
- Black, S. and P. Strahan (2001), 'The Division of Spoils: Rent Sharing and Discrimination in a Regulated Industry', *The American Economic Review*, Vol. 91, No. 4, September, pp. 814–31.

- Brown, C. J., J. A. Pagan, and E. Rodriguez-Oreggia (1999), 'Occupational Attainment and Gender Wage Differentials in Mexico', *Industrial and Labor Relations Review*, Vol. 53, No. 1, October, pp. 123–35.
- Comercio Exterior (1971), 'Texto del Nuevo Reglamento para las Industrias Maquiladoras de Exportación' [New Rules Text for the Maquiladora Export Industry], *Comercio Exterior*, Vol. 21, April, pp. 290–91.
- Hansen, G. H. and A. Harrison (1999), 'Trade Liberalization and Wage Inequality in Mexico', *Industrial and Labor Relations Review*, Vol. 52, No. 2, January, pp. 271–88.
- Hanssen, A. (1998), 'The Cost of Discrimination: A Study of Major League Baseball', *Southern Economic Journal*, Vol. 64, No. 3, January, pp. 603–27.
- Hellerstein, J. K., D. Neumark, and K. R. Troske (1997), 'Market Forces and Sex Discrimination', NBER Working Paper 6321, December, Cambridge MA: NBER.
- Hunt, Lacy H. (1970), 'Desarrollo Industrial en la Frontera Mexicana', *Comercio Exterior*, Vol. 20, No. 4, pp. 304–09.
- INEGI (2002), Web link: <http://www.inegi.gob.mx> .
- Organization for Economic Cooperation and Development (OECD)(1996), *Trade Liberalization Policies in Mexico*, Paris: OECD.
- Udry, C. (1996), 'Gender, Agricultural Production, and the Theory of the Household', *Journal of Political Economy*, Vol. 104, No. 5, October, pp. 1010–46.
- Wee, Vivienne (ed.) (1998), *Trade Liberalisation: Challenges and Opportunities for Women in Southeast Asia and Beyond*, New York: UNIFEM and Engender.
- Weston, Ann (1999), 'Gender and Trade: A Millennium Round Agenda?', manuscript, Asia Pacific.