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Women's Industrial Employment in Mexico, Measures of Segregation and Discrimination[*]

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Abstract: Employment has become one of Mexico's most excruciating problems. During the last decade, the rise in employment has not been enough to cope with the growth of the population seeking jobs. The informal sector has grown at a fast speed and currently represents more than 60% of total occupation. Although the principal source of Mexico's exports is manufactured products, women's employment in industry has steadily decreased and has remained in mostly low-skilled occupations. The surge in trade and investment brought by NAFTA did not result in an increase in employment and wages. Also, it did not facilitate any type of convergence between Mexico and its NAFTA partners. An increase in trade and foreign investment is not a substitute for a coherent national development strategy that fosters growth and employment.

Key words: gender; wages; employment; discrimination

JEL codes: J15, J16, J31, J71

1. Introduction

Employment in Mexico has grown slowly during recent years and mostly in the informal sector. The amount of informal occupation — defined as those persons with a job that do not have social security — has grown to 64% of total occupation. Unemployment has risen to more than 5% from a former level of 2.5%. Wages have dropped and women have suffered the brunt of this decline, not only in terms of wages but also through the growing informal sector and poverty.

Industrial production as a percentage of the Gross Domestic Product (GDP) has decreased during recent decades from levels above 23% to levels below 19%. Although technology partially explains these changes, the main modifications involve the nature of the industrial apparatus. Since the opening of Mexico's economy (in 1986 with its entrance into GATT and then with the signing of NAFTA in 1994), many of the industrial productive chains created during the former period (import substitution period) disappeared, with the opening to imports and the hard and fast competition that took place. An additional aspect with a major effect on industrial production is the *maquiladora* industry, which currently represents more than 50% of total exports, although its contribution to

the value-added chain is around 3% at the national level and 9% at the industrial level.

Today, manufacturing exports account for over 80% of total exports. The relation of exports to the GDP has increased from 10.6% in 1993 to over 38% by 2007. However, the relation of imports to the GDP has also increased from 16.3% before NAFTA to 43.6% in 2007. Intermediate goods currently represent almost three quarters of total imported goods, and three quarters of the total aggregate supply, and around 78% of total exports contain imported intermediate goods (Romero, 2009).

Although the rise in imports has contributed to maintaining low price levels, and in some industrial branches it has created competitive advantages, imports have caused a harsh impact in terms of breaking industrial chains and also increasing unemployment.

Most multinational corporations have specialized in assembly processes in Mexico, while the main value-added chains, as well as R&D processes, take place in other global sites.

In the context of this panorama, the purpose of this paper is to evaluate the impact of these changes on women's employment in the manufacturing industry, in terms of type of occupation, formal versus informal sector, place of occupation, educational level and income level.

The first section of this paper is focused on a general analysis of employment in Mexico, with special emphasis on female employment. The second section studies female employment in the manufacturing industry by type of jobs, size of work center, level of income, number of hours worked and level of education. The third section delves deeper into the industrial branches in which female employment is more significant and statistical and distributional analysis is used to analyze the wage differences between males and females, identifying the factors that can directly and indirectly explain the serious discrimination experienced by females. Lastly, the results obtained are evaluated and proposals are made for generating decent employment and correcting the types of gender bias experienced.

2. Employment in Mexico

According to Mexico's National Occupation and Employment Survey (*Encuesta Nacional de Ocupación y Empleo E*NOE, 2011), the current total occupied population (over 14 years old) consists of over 45 million persons, of whom 37% are females.

Table 1   Occupied Population, Females and Males in Mexico 2005–2011

	2005	2006	2007	2008	2009	2010	2011
Population 14 years and older	73448358	74268509	75580098	76808974	78171076	81912804	83311565
Occupied Population	40575874	41721115	42400462	43320677	42915615	45000120	45430178
Formal	14020945	14493319	15049654	15313241	15439997	15529202	15936518
Informal	26554929	27227796	27350808	28007436	27475618	29470918	29493660
Unoccupied Population	1639787	1528549	1747929	1779344	2288659	2503469	2481167
Males	26097820	26308070	26589035	27040003	26938499	28141154	28588929
Formal	8861912	8950357	9307112	9475678	9497592	9537962	9847137
Informal	17235908	17357713	17281923	17564325	17440907	18603192	18741792
Unoccupied Population	980772	941117	1025301	1072598	1442658	1580825	1612150
Females	14478054	15413045	15811427	16280674	15977116	16858966	16841249
Formal	659015	5542962	5742542	5837563	5942405	5991240	6089381
Informal	5159033	9870083	10068885	10443111	10034711	10867726	10751868
Unoccupied Population	9319021	587432	722628	706746	846001	922644	869017

Sources: INEGI, ENOE, first quarter.

The growth rate of the economically active population marked a decrease from 3.7% during 1970–1983 to 1.9% from 1994 to 2010, while the growth rate of the occupied population diminished from 4.1 to 1.7 during this period. The foreign crisis had a big impact on employment, and only 430,058 new jobs were created during the last two years.

Currently, 62% of the total occupied population works in the tertiary sector, 24% in the secondary sector and 13% in the primary sector. About 62% work for wages and 38% are divided between those self-employed (22%), those receiving professional fees or commissions (5%), those who are employers (5%), and those receiving no payment (6%).

By activity sector, males and females work formally in the manufacturing industry, in commerce, social services and the government and international entities. In contrast, in the informal sector 25% of male occupations are in the agricultural sector, 16% in construction, 16% in commerce and 11% in diverse services. And females find 33% of their informal occupations in commerce, 22.6% in diverse services, 14% in restaurants and food, and 12.4% in the manufacturing industry.

Table 2   Formal and Informal Occupations by Activity Sector

	2011			
	Males		Females	
Activity Sector	Formal	Informal	Formal	Informal
Total	100	100	100	100
Agriculture, livestock, forestry, hunting and fisheries	2.6	24.6	0.8	4.6
Extractive and electricity industry	3.2	0.2	0.9	0.0
Manufacturing industry	22.6	10.6	16.1	12.4
Construction	6.7	16.0	1.4	0.4
Commerce	16.0	16.0	16.0	33.1
Restaurants and lodging services	4.3	5.4	5.4	14.4
Transportation, mail and storage	6.7	6.7	2.8	0.6
Professional, financial and corporate services	8.2	6.2	9.7	4.6
Social services	12.2	1.7	30.7	5.3
Diverse services	4.2	11.1	2.9	22.6
Government and international entities	13.2	1.6	13.7	1.9
Not specified	0	0	0	0

Sources: INEGI, ENOE, first quarter.

Regarding income level, 55% of occupied workers receive three minimum wages or less and 3.6 million workers do not receive any payment. In the formal sector a very limited number of persons receive minimum wage, whereas in the informal sector, nearly 6 million persons receive this wage.

The proportion of females who work fewer than 15 hours is nearly three times greater than the number of males who work this number of hours. Of the females with this number of work hours, 59% earn minimum wage, in comparison to 40% of males in this regard. Of those who work between 15 and 34 hours of work, the proportion of women who earn a minimum wage is higher at 32%, than for males, at 24.5%. Only 8.8% of females who work between 35 and 48 hours earn more than three and up to five minimum wages, in comparison to 14% for males. And, among those who work more than 48 hours, only 5.7% of females earn more than 5 minimum wages, in comparison to 11.4% of males.

The level of schooling among the formal and informal occupied population varies considerably. Among the formal occupied population, 48% have a senior-high education; in comparison to 20% of the informal occupied population (22% of those in informal jobs have not completed elementary school, while only 4% of those in formal jobs are in the same situation). Of those with formal jobs, only 12% are at the level of completed elementary school, while 27% of those with informal jobs are in this category.

Table 3   Occupied Population According to Educational Level

Educational Level	2011					
	Informal			Formal		
	Occupied	Males	Females	Occupied	Males	Females
Partial elementary	22%	23%	21%	4%	5%	3%
Completed elementary	27%	27%	26%	12%	13%	9%
Completed junior-high	31%	30%	33%	36%	37%	34%
Senior high and university	20%	20%	20%	48%	45%	54%
Not specified	0%	0%	0%	0%	0%	0%

Sources: INEGI, ENOE 2011.

Analyzing the data by sex, we find that females have higher educational levels than males, particularly among those in the formal sector (54% of females have a senior-high or university education, while only 45% of males have attained this level). In the informal sector 33% of females have a junior-high education, compared to 30% of males, and the same percentage (20%) of females and males have a senior-high or university education.

3. Women in Manufacturing Employment

From 2005 to 2011 the number of manufacturing jobs increased from 6.9 million to 6.95 million. Only 53,509 new jobs were created, and the number of females employed decreased by 88,000, thus the new jobs created during this period was for males.

Of the 6,952,462 million jobs in the manufacturing industry in 2011, males had 4,423,901 million, and females had 2,528,561 million (36.3% of the total, of which 16% were formal and 20% informal).

Table 4   Occupied Population in the Total Manufacturing Industry, by Sex, with Numbers and Percentages

	Males		Females		Total	
Food industry	882271	19.9	748715	29.6	1630986	23.5
Beverages and tobacco industry	198547	4.5	44475	1.8	243022	3.5
Manufacturing of textile inputs	78725	1.8	41013	1.6	119738	1.7
Manufacturing of garments from textile products	43080	1	140458	5.6	183538	2.6
Manufacturing of garments and accessories	253761	5.7	478100	18.9	731861	10.5
Manufacturing of products of leather, fur and substitute materials, except garments	171318	3.9	86676	3.4	257994	3.7
Lumber industry	124472	2.8	10119	0.4	134591	1.9
Paper industry	88853	2	48016	1.9	136869	2.0
Printing and related industries	122391	2.8	59476	2.4	181867	2.6
Manufacturing of petroleum and coal derived products	42234	1	11849	0.5	54083	0.8
Chemical industry	186564	4.2	103708	4.1	290272	4.2

To be continued

Continued

Plastics and rubber industry	165136	3.7	102838	4.1	267974	3.9
Manufacturing of products based on non-metal minerals	295944	6.7	50882	2	346826	5.0
Basic metal industries	96706	2.2	9493	0.4	106199	1.5
Manufacturing of metal products	511637	11.6	49752	2	561389	8.1
Manufacturing of machinery and equipment	80293	1.8	15836	0.6	96129	1.4
Manufacturing of computer, communication, measurement and other types of equipment	111283	2.5	94021	3.7	205304	3.0
Manufacturing of electricity-generating equipment and electric devices and accessories	93472	2.1	59125	2.3	152597	2.2
Manufacturing of transportation equipment and automotive vehicle parts	395863	8.9	193716	7.7	589579	8.5
Manufacturing of furniture, mattress, and blinds	355856	8	41475	1.6	397331	5.7
Other manufacturing industries	125307	2.8	138818	5.5	264125	3.8
Not specified	188	0	0	0	188	0.0
Total	4423901	100	2528561	100	6952462	100.0

Sources: INEGI, ENOE 2011.

There is a high degree of occupational segmentation affecting female workers, since 79% of female industrial employment is found in only eight of the twenty one industrial subsectors. Nearly 30% of all the female industrial jobs are in the food industry, 19% in garment manufacturing, 7.7% in vehicle manufacturing, 5.6% in the manufacturing of textile products, 5.5% in other industries, 4.1% in the chemical industry, 4.1% in the plastics industry, and 3.7% in the computer industry.

Table 5 Formal and Informal Employment in 8 Subsectors in the Manufacturing Industry 2011

	Formal						Informal					
	Males	%	Females	%	Total	%	Males	%	Females	%	Total	%
Total	2510193	100%	1133512	100%	3643705	100%	1913708	100%	1395049	100%	3308757	100%
Food industry	429527	17%	183971	16%	613498	17%	452744	24%	564744	40%	1017488	31%
Manufacturing of textile products	19953	1%	17285	2%	37238	1%	23127	1%	123173	9%	146300	4%
Garment manufacturing	97689	4%	113934	10%	211623	6%	156072	8%	364166	26%	520238	16%
Chemical industry	163620	7%	93406	8%	257026	7%	22944	1%	10302	1%	33246	1%
Plastics and rubber industry	138787	6%	86575	8%	225362	6%	26349	1%	16263	1%	42612	1%
Manufacturing of computer, communication, measurement and other types of electronic equipment	106379	4%	91526	8%	197905	5%	4904	0%	2495	0%	7399	0%
Manufacturing of transportation equipment and for automotive vehicles	382500	15%	188109	17%	570609	16%	13363	1%	5607	0%	18970	1%
Other manufacturing industries	65466	3%	71255	6%	136721	4%	59841	3%	67563	5%	127404	4%

Sources: INEGI, ENOE 2011.

In the food industry of the 1.6 million jobs, over one million are informal jobs and 613 thousand are formal jobs. Forty percent of all informal female jobs are in this subsector, 26% are in garment manufacturing and 9% in

the manufacturing of textile products. In all, 75% of all female informal jobs are in these three branches, while the percentage for female informal jobs in all the manufacturing industries combined is only slightly higher, at 80%.

In formal employment, females find 17% of their jobs in the manufacturing of transportation equipment, 16% in the food industry, 10% in the garment industry, 8% in the chemical industry, 8% in the plastic industry, and 8% in the computer industry.

In the eight subsectors in which 79% of female industrial employment is concentrated, we find a number of specificities. In three of these subsectors (manufacturing of textile products, manufacturing of garments and accessories, and other industries), the total female occupation is higher than the total male occupation, and 30% of the total female industrial employment is in these three subsectors. There are five other branches in which female occupation is high. Specifically, 29.6% of the total female manufacturing occupation is in the food industry alone, while 49.2% is in the chemical industry, the plastics and rubber industry, the computer, communication and other equipment industry, and the transportation equipment industry combined.

If we compare some aspects of workers in the eight subsectors, including the level of schooling, average monthly income and average income per hour worked, we find some significant differences. The levels of schooling are relatively higher among males than females, particularly at the senior-high and university level.

Educational levels for females working in the textile manufacturing industry (except garment) are the lowest: 44% of females have not completed elementary school, 26% have only completed elementary school, and only 5.2% have a senior-high or university education.

Table 6　Occupied Population by Sex and Level of Schooling, in 8 Subsectors of the Manufacturing Industry

	Males				Females			
	Partial or complete elementary		Junior high	Senior high and university	Partial or complete elementary		Junior high	Senior high and university
	8.8	18.2	42.5	30.5	17	23.6	40.2	19.2
Foodindustry	13.4	22.3	39.5	24.8	22.4	25.5	36.9	15.2
Manufacturing of textile products	5.3	19.5	47.2	28	44.1	26.5	24.3	5.2
Manufacturing of garments and accessories	11.6	23.2	44.4	20.8	16.7	28.8	41.5	13.1
Chemicalindustry	2.9	10.9	34.6	51.5	1.3	16.2	28.6	53.8
Plastics and rubber industry	7.6	19.1	43.4	30	5	20.9	49.4	24.7
Manufacturing of computer, communication, measurement and other types of equipment	1.9	12.1	39.9	46.2	1.9	11.5	58.9	27.7
Manufacturing of transportation equipment and automotive vehicle parts	2.4	9.8	50.8	37	4.3	17.1	55.1	23.5
Other manufacturing industries	8.4	21.1	44.2	26.2	10.5	17	38.7	33.8

Sources: INEGI, ENOE 2011.

Only in the categories of the chemical industry and other industries, more female workers are at a higher educational level than males.

When average monthly income is analyzed, we find great disparity between male income and female income, in favor of the first. The greatest disparity is found in the manufacturing of textile products (except garments) subsector, in which males earn three times more than females.

In the three manufacturing branches in which female employment is greater than male employment, the

average income of males is 1.6 times greater than that of females. This proportion is maintained in the industry in which females have the majority of the jobs (food industry), while in the chemical and the plastics and rubber industries, there is greater income equality. In branches with a high level of exportation, such as the computer and transportation equipment branches, males earn 1.4 times more than females.

Table 7   Average Monthly Income of Occupied Population in 8 Subsectors of the Manufacturing Industry

	Average income for males	Average income for females	Total	M/F
Manufacturing of textile products except garments	5284.91	1428.64	2302.73	3.7
Manufacturing of garments and accessories	3870.89	2645.94	3070.54	1.46
Other manufacturing industries	4875.38	4072.58	4447.86	1.2
Sub-total	*4298.56*	*2668.09*	*3244.62*	*1.61*
Food industry	4771.1	2977.73	3969.66	1.6
Chemical industry	7392.15	7140.09	7306.12	1.04
Plastics and rubber industry	5126.84	4462.08	4878.19	1.15
Manufacturing of computer, communication, measurement and other types of equipment	6474.2	4366.3	5505.38	1.48
Sub-total	*5286.46*	*3612.09*	*4568.2*	*1.46*
Manufacturing of transportation equipment and automotive vehicle parts	6127.49	4195.59	5462.21	1.46

Sources: INEGI, ENOE 2011.

In an analysis of hourly income, we find that the industrial subsector with the lowest hourly income for females is the textile manufacturing except garment (13.26 pesos per hour), while in contrast, males in this industry earn 28.94 pesos per hour. The subsector with the highest income is the chemical industry in which males earn 41.62 pesos per hour, and female's income is closer to that of males than in other subsectors (40.51 pesos per hour).

Table 8   Hourly Income of Occupied Population, in 8 Subsectors of the Manufacturing Industry

	Males	Females	Total	Differences
Food industry	25.39	22.39	24.06	3
Manufacturing of textile products except garments	28.94	13.26	16.79	15.68
Manufacturing of garments and accessories	22.05	18.12	19.5	3.93
Chemical industry	41.62	40.51	41.25	1.11
Plastics and rubber industry	27.48	24.43	26.3	3.05
Manufacturing of computer, communication, measurement and other types of equipment	37.07	24.77	31.37	12.3
Manufacturing of transportation equipment and automotive vehicle parts	32.44	23.43	29.37	9.01
Other manufacturing industries	28.49	24.56	26.39	3.93
Total	28.56	21.9	25.38	6.66

Sources: INEGI, ENOE 2011.

3.1 Characteristics of Two of the Eight Subsectors

Trying to emphasize differences between men and women we choose two emblematic subsectors to compare between them: manufacturing of textile products (except garments) and chemical industry.

In the manufacturing of textile products of the 183,538 jobs, 76% are filled by females. The informal sector in this industrial branch is very large, since nearly 80% of the total occupied population and 67% of females alone work in the informal sector. In this industrial branch, 99% of females and 87% of males are industrial workers,

and in the formal sector, 87% of females and 81% of males are industrial workers. In the formal sector, 7% of males and 1% of females work as professionals and technicians, and 12% of males in the informal sector are in the category of small businesspeople.

The level of schooling of those working in this industry is the lowest of the eight subsectors studied. In particular, nearly 50% of the females working in the informal sector have not completed elementary school, 26% have only completed an elementary school level, and 21% have a junior-high education.

In contrast in the chemical industry of the 290,272 jobs, 36% are filled by women. Jobs are predominantly in the formal sector (89%), and in particular 90% of female employment is in the formal sector. This industrial branch is also characterized by a higher level of schooling among female workers (57% at the senior-high and university level) than among males (53%) in the formal sector. In contrast, of the females working in the informal sector, fewer (22%) have attained a senior-high or university education than males (41%).

The higher level of schooling coincides with 20% of females in the formal sector working as professionals or technicians (in comparison with 17% of males), 21% as office workers, 2% as functionaries or directors, in comparison to 5% of males; and only 30% of these females are industrial workers (in comparison to 47% of males), with 17% categorized as small businesspeople. In the informal sector, 70% of the females are industrial workers, 10% are professional workers, and 2% are directors.

Income levels in the manufacturing of textile products are also the lowest in the eight subsectors studied. Males earn 3.5 times more than females, with 75% of females in the informal sector receiving only one minimum wage, 8% receiving two minimum wages and 10% do not receive any payment, while 67% of males earn up to two minimum wages. In the formal sector, nearly 40% of females receive up to two minimum wages, compared with 8% of males, and 33% of females receive up to three minimum wages. In contrast, 45% of males earn between two and three minimum wages and 35% of them receive between three and five minimum wages.

One of the causes of the low wages for females is likely that in addition to their low educational levels, they work fewer hours. Specifically, of the 140,450 females working in this industry, 44,000 work in the informal sector fewer than 15 hours a week, and another 42,000 work in the informal sector between 15 and 24 hours a week. However, of the 17,000 females who work in the formal sector, 14,000 work between 40 and 46 hours a week.

The Chemical industry is one of the few industries in which as much as 21% of the females working in the formal sector earn more than five minimum wages, in comparison to 20% of males, but at the same time, 20% of the females earn between only one and two minimum wages. In the informal sector, 38% of females do not receive any payment at all, while income is not specified for 21%, and most of the females are earning between one and three minimum wages. Only 405 females in the formal sector work fewer than 15 hours, while most of them (91%) work between 40 and 56 hours a week. In the informal sector, their numbers of hours are more dispersed among the different categories, but 62% of them also work between 40 and 56 hours a week.

3.2 Measurements of Discrimination

As we have seen in the manufacturing industry in general, and particularly in the eight subsectors corresponding to 80% of female occupation, there are clear differences between males and females in terms of wages, educational levels, employment conditions and hours worked. Some differences have observable characteristics (wages, education, type of occupation, hour worked), but others do not.

Using Ñopo (2008) methodology (in contrast to Blinder-Oaxaca econometric methodology), for explaining gender wage differentials as a non parametric alternative of the matching type, we can find observable distribution characteristics between men and women that support the non explained wage salaries differential.

If Y is the random variable of individual incomes and X *is* the individual characteristic vector (such as age, education, labor experience, size of the enterprise, etc), $F^M(\cdot)$ and $F^F(\cdot)$ are the accumulated distributional functions conditional to individual characteristics X, for men and women, and $dF^M(\cdot)$ and $dF^F(\cdot)$ the measured probabilities. So $\mu^F(S)$ identifies the probability measure of the group S inside the distribution $dF^F(\cdot)$ for women, that is $\mu^F(S) = \int_s dF^F(x)$ and $\mu^M(S) = \int_s dF^M(x)$ for men.

The relation between random variables is model by functions $g^M(\cdot)$ and $g^F(\cdot)$, that represent the incomes expected value according to individual and gender characteristics. The conditioned expected incomes for men and women can be identified as:

$$E[Y|M] = \int_{S^M} g^M(x)dF^M(x) \tag{1}$$

$$E[Y|M] = \int_{S^F} g^F(x)dF^F(x) \tag{2}$$

Were S^M is the supports of men's characteristics and S^F is for women. The wage differential is written as the expected income differences between men and women, conditioned to its individual characteristics:

$$\Delta = E[Y|M] - E[Y|F] = \int_{(S^M)} [g^M(x)dF^M(x)] - \int_{(S^F)} [g^F(x)dF^F(x)] \tag{3}$$

If we consider that support for each distribution is different by gender, integrals are open and two dominions are open in two parts: the first one is the intersection of their supports and the other one is outside is common support; so considering a similar decomposition to Blinder-Oaxaca, the wage differential results in:

$$\Delta = [\int_{\overline{S^F}} g^M(x)\frac{dF^M(x)}{\mu^M(\overline{S^F})} - \int_{S^F} g^M(x)\frac{dF^M(x)}{\mu^M(S^F)}]\mu^M(\overline{S^F}) +$$

$$\int_{S^M \cap S^F} g^M(x)[\frac{dF^M}{\mu^M(S^F)} - \frac{dF^F}{\mu^F(S^M)}](x) + \int_{S^M \cap S^F} [g^M(x) - g^F(x)]\frac{dF^F(x)}{\mu^F(S^M)} + \tag{4}$$

$$[\int_{S^M} g^F(x)\frac{dF^F(x)}{\mu^F(S^M)} - \int_{\overline{S^M}} g^F(x)\frac{dF^F(x)}{\mu^F(\overline{S^M})}]\mu^F(\overline{S^M})$$

The wage difference between males $E[Y|M]$-| and females $E[Y|F]$-| may be decomposed into four parts.

$$\Delta = E[Y|M] - |E[Y|F] = \Delta_M + \Delta_X + \Delta_0 + \Delta_F\text{-}| \tag{5}$$

Three components might be attributed to gender differences, according to observable individual characteristic $(\Delta_M, \Delta_X \; y\Delta_F)$ and the fourth to the existence of gender differences in non observable characteristic that determine wages and discrimination in payment within the labor market (Δ_O):

Δ_X is the part of the differential explained by individual characteristics (X) that are similar between males and females, and that are distributed in a zone of common support.

Δ_F is the differential explained by the fact that there are some combinations in the characteristics of females that are not comparable to males. For example, it is possible to find married females, with minimal education, without experience or training, with labor segmentation and segregation, and with an unequal distribution in the burden of non-remunerated caretaking work and domestic tasks that negatively affects them — without finding males with these characteristics.

Δ_M is the differential in which characteristics of males are identified — characteristics that cannot be easily found among females, such as a university education and over ten years of experience.

Δ_O is the part of the wage differential between males and females that cannot be explained by the differences in the observable characteristics mentioned above.

3.2.1 Data

In the case of Mexico, indicators from the National Occupation and Employment Survey (*Encuesta Nacional de Ocupación y Empleo* — ENOE) from the first quarter of 2011 were also used. The wage income for males and females was analyzed, taking into consideration only the national occupied population, the manufacturing industry and its subsectors. The observable individual characteristics (X) for males and females were:

(1) Age: number of years at the time of the survey.

(2) Years of education: accumulated years of education completed, by school year (elementary, junior-high, senior-high, university and graduate level).

(3) Amount of time working or experience: years worked in the same company or institution.

(4) Hours of training: hours dedicated to training courses.

(5) Economic assistance: qualitative variable with a value of 1 if economic assistance from social programs is received, and otherwise, zero.

(6) Married: qualitative variable with a value of 1 if married, and otherwise, zero.

3.2.2 Results of Analysis

The following tables present the differentials of the job earnings of males as a percentage of the job earnings of females, and their decomposition into four components, in line with the methodology developed by Ñopo (2008). The wage differentials presented consider the national occupied population, the manufacturing industry and its subsectors, in accordance with the ENOE survey. Also presented in the tables are the proportions of males and females in the zone of common support among their distributions (% CS Males & Females).

The strategy for estimation and analysis of the differentials is very similar to that proposed by Ñopo (2008), in which, first of all, **age** is included as an observable variable and differentials are calculated. Then, other characteristics are added to **age**, such as **years of education**, thus when there is a reference to + **years of education**, it means the observable characteristics included are **age** and **years of education**. With this estimation strategy, analysis is concentrated on the stability of the gender wage differential and its four components, as well as the proportion of males and females in the zone of common support.

As variables are added, the proportion of the zone of common support is reduced, and in some subsectors, it is very small or even non-existent.

The results of the estimations indicate that:

At the national level the average wage differential in Mexico is not particularly high (0.15%).

Table 9 Decomposition of Gender Wage Differential, Mexico 2011

Differential (Δ) as a percentage of female wages	Age	+ Years of education	+ Amount of time working (experience)	+ Hours of training	+ Economic assistance	+ Married
Total Occupied Population						
Δ	0.15	0.15	0.15	0.15	0.15	0.15
Δ0	2.08	4.83	8.35	9.03	9.91	11.05
ΔM	-0.01	0.26	-0.63	-0.55	-1.29	-1.11
ΔF	0.00	-0.08	-1.56	-2.84	-2.16	-3.13
ΔX	-1.92	-4.86	-6.01	-5.49	-6.31	-6.66
% CS Males	99.99	99.54	84.09	80.64	77.37	71.08
% CS Females	100.00	99.87	93.14	89.30	81.72	76.00

Source: Developed by authors based on decomposition as proposed by Ñopo (2004) and with data from the ENOE (2011-I) survey by INEGI, Mexico.

However when we study the information for the manufacturing industry, the average wage differential

increases to nearly 30% (29.98). In some of the variables studied, as in years of education, the percentage of males and females that enter into the zone of support for males and females is rather high. In the case of other variables, it is lower, and it is even lower for the manufacturing industry than at the national level. A possible explanation for these differences may be that females at the national level attain equal or higher educational levels than males, while this is not the case for female industrial workers, since they are in lower positions, have little or no training, and less education and work experience. It is very likely that other possible causes of high Δ and Δ_0 are the hours that women dedicate to household activities, such as cleaning, preparing meals and caring for young children and elderly family members.

Table 10   Occupied Population in the Manufacturing Industry

Differential (Δ) as a percentage of female wages	Age	+ Years of education	+ Amount of time working (experience)	+ Hours of training	+ Economic assistance	+ Married
Δ	29.98	29.98	29.98	29.98	29.98	29.98
Δ_0	30.64	26.69	23.97	24.39	23.52	23.37
ΔM	-0.02	0.62	5.70	4.90	4.80	7.89
ΔF	0.01	-1.24	-1.34	-1.52	-0.81	-2.64
ΔX	-0.65	3.92	1.65	2.21	2.47	1.36
% CS Males	99.98	96.33	65.45	62.44	59.58	49.90
% CS Females	99.99	98.95	75.34	72.05	63.90	56.23

Source: Developed by authors based on decomposition as proposed by Ñopo (2004) and with data from the ENOE (2011-I) survey by INEGI, Mexico.

Table 11   Occupied Population in the Manufacturing Industry — Eight Subsectors Selected

	Differential (Δ) as a percentage of female wages	Age	+ Years of education	+ Amount of time working (experience)	+ Hours of training	+ Economic assistance	+ Married
Food industry	Δ	20.79	20.79	20.79	20.79	20.79	20.79
Gender wage discrimination	Δ_0	20.84	19.99	22.51	24.68	24.47	18.32
Manufacturing of textile products other than garments	Δ	107.49	107.49	107.49	107.49	107.49	107.49
Gender wage discrimination	Δ_0	99.81	21.44	122.72	122.72	88.30	113.23
Manufacturing of garments	Δ	22.70	22.70	22.70	22.70	22.70	22.70
Gender wage discrimination	Δ_0	30.56	28.80	16.65	13.43	13.74	21.23
Chemical industry	Δ	11.17	11.17	11.17	11.17	11.17	11.17
Gender wage discrimination	Δ_0	16.20	5.77	-31.09	-35.70	-40.19	-18.96
Plastics and rubber industry	Δ	11.72	11.72	11.72	11.72	11.72	11.72
Gender wage discrimination	Δ_0	16.29	1.24	-8.65	7.47	14.85	19.09
Manufacturing of computer, communication, measurement and other types of equipment	Δ	46.58	46.58	46.58	46.58	46.58	46.58
Gender wage discrimination	Δ_0	30.91	22.43	-6.10	-4.29	3.35	12.71
Manufacturing of transportation equipment	Δ	30.68	30.68	30.68	30.68	30.68	30.68
Gender wage discrimination	Δ_0	26.21	17.02	17.37	17.92	14.78	13.10
Other industries	Δ	12.25	12.25	12.25	12.25	12.25	12.25
Gender wage discrimination	Δ_0	20.06	23.21	17.79	16.60	18.26	-1.49

Source: Developed by authors based on decomposition as proposed by Ñopo (2004) and with data from the ENOE (2011-I) survey by INEGI, Mexico.

In the eight industrial branches we have studied, the unexplained component in the variables studied — that

may be due to wage discrimination against females — is much higher than the national average, but in five of them (food, garment, chemical, plastics and other industries) it is lower than the average for manufacturing industries. In the case of manufacturing of textile products other than garments, what has already been seen is confirmed; specifically that wage discrimination is extremely high, at 107%. Next in line is the manufacturing of computer and measurement equipment (46.58%), followed by the manufacturing of transportation equipment (30.68%). In contrast, in the chemical, plastics and rubber, and other industries, we find female wage differentials that fluctuate between 11 and 12%. We can also see that there are differentials in favor of females in the chemical, plastics and computer industries (See Table 11).

In order to graphically express the relationship between the proportion of the unexplained differential and the explanatory variables, a table is presented below, which contains all the components together, specifically **age + years of education + amount of time working (experience) + hours of training + economic assistance + married** are once again very high for the textile products (other than garments) industry, negative for the chemical industry and other industries, and relatively low for the rest of the subsectors.
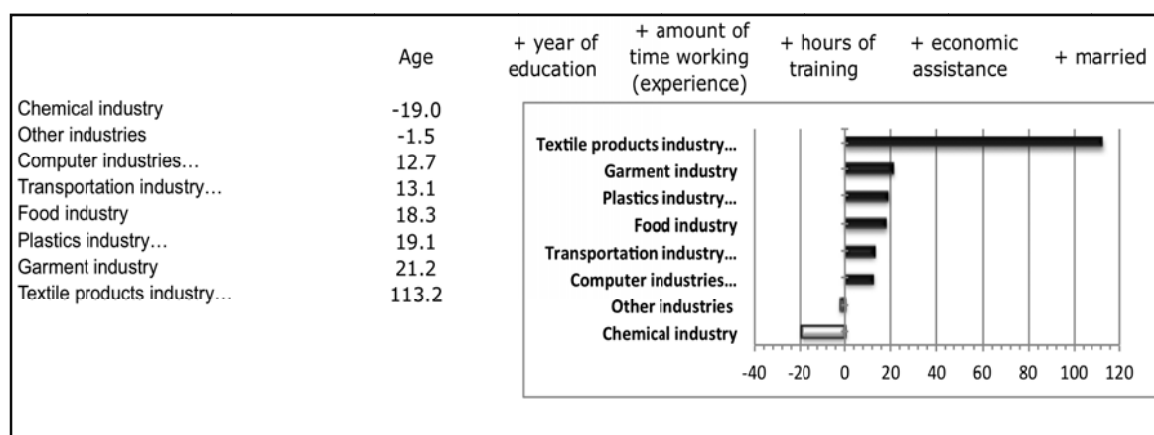

Figure 1   Unexplained Differences by Industries

Source: Developed by authors based on decomposition as proposed by Ñopo (2004) and with data from the ENOE (2011-I) survey, INEGI, México

4. Final Remarks

If we look at the information on the overall manufacturing industry employment, and especially for females, we can affirm that the situation in the manufacturing industry is deplorable.

In addition to being a sector that expels the female labor force (as illustrated in the reduction in female jobs by over 88,000 between 2005 and 2011), the eight subsectors studied — in which female employment is higher and/or represents the majority in three of them — are characterized by females having lower levels of education than males in six of them, and females working mostly as industrial workers, and technicians and directors in smaller numbers. In the eight subsectors, females earn less than males, and in terms of hours worked, females generally work fewer hours than males in many industries, but in others their work hours are similar to those of males.

In a statistical and econometric analysis of information on the eight subsectors, different aspects of the information were reviewed. Levels of schooling, types of occupations, income levels and hours worked were studied in the statistical analysis. And in the econometric analysis, the variables compared included age, years of education, amount of time working (experience), training, economic assistance and marital status.

The results from this analysis indicate that there are major wage gaps between males and females that can be explained by differences in education, job experience, training, economic assistance from government programs and marital status. However, these same variables do not impact wage gaps in the unexplained part or in wage discrimination against females — which turned out to be the highest among the components of wage gaps. Nevertheless, there are two subsectors — chemical industries and other industries — in which wage discrimination works against males, primarily because females are better educated and work similar hours to those of males — although they earn less than males.

While the national wage gap turned out to be relatively low (0.15%) in the manufacturing industry, this discrepancy led to much higher results (30%). When we looked at the information for the eight subsectors studied, we found that in all of these industrial branches except one (textile products other than garments), the averages for the unexplained wage discrepancy were lower than the average for the overall manufacturing industry.

In relation to education, a junior-high education is the predominant level in the eight subsectors studied, except for two of them. One is the textile products (other than garments) industry, in which the number of workers who did not complete elementary school is very high (44.1%), and the completed elementary level is the next highest (26.75%). The other subsector is the chemical industry in which 53.8% of the occupied population has a senior-high or university education, and only 1.3% did not complete elementary school.

The textile products (other than garments) industry is characterized by having the greatest wage discrepancy, at a male/female ratio of 3.5, and it also has the lowest educational level, with the majority (76%) working in the informal sector and also working fewer hours than in the other subsectors (31% with fewer than 15 hours, and 30% with between 15 and 24 hours per week). These are likely reasons that explain why wage discrepancies are so high, and that raise the average for the eight subsectors studied.

A likely cause for the reduced presence of manufacturing industries in the national economy is the low productivity that in general characterizes the country's industries today. Together, the high import content of industrial inputs (78% of industrial inputs are imported), the breakdown in productive chains, the absence of its own technological developments, and the presence of significant *maquiladora* and assembly-plant segments have led to a permanent reduction in this sector's share of the national value added.

This type of industrial development has brought stagnation and reduction in employment, and in the case of female workers, the high labor flexibility that many of them require in order to participate in the labor market, together with aspects not evaluated here — such as new forms of production that include outsourcing and subcontracting, women having young children at home, the fact that much of the work in this industrial occupation is in the informal sector, possibly in the home and with flexible work hours — all lead to the high levels of segregation and wage discrimination that we find in this sector.

There are a number of policies that must be implemented in order to improve the conditions in the national industry and particularly in employment. It is absolutely necessary to recuperate and strengthen the national industry as a key sector for national growth, on the basis of industrial policies that re-establish national productive chains, promote the development of national technology, create capital goods industries, and favor productivity and competitiveness in national and international markets.

In terms of industrial employment, it is vital that the occupied population, particularly the female occupied population, increase its level of schooling and training, improve its working conditions, and move from the informal sector to the formal sector. This will signify abandoning the policy of competitiveness based solely on low wages and poor working conditions.

Following the recommendations from the International Labor Organization (2009), policies must be established for: maintaining female and male employment to the degree possible; supporting job creation and promoting investment in labor-intensive sectors, including green jobs; facilitating a quicker re-insertion in employment and containing wage deflation; protecting the most vulnerable persons and those working in the informal sector; strengthening social protection systems for maintaining sustainable income and subsistence levels; accelerating job recuperation and expanding opportunities for jobs, working simultaneously to impact both supply and demand; and providing the labor force with the job skills necessary today and in the future.

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