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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
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(R) WOMEN IN THE PHARMACEUTICAL SECTOR :

AN ASSESSMENT OF THE EXPERIENCE OF PUERTO RICO

A Report

Prepared by

Suphan Andic, Ph. D.

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NOTE

Several official publications form the data source of the present analysis and assessment. Frequent reference is made particularly to three. Below is their full title and the abbreviated form in which they are referred to:

	Title	Abbreviation
1.	P.R. Dept. of Labor and Human Resources, Census of Manufacturing Industries in Puerto Rico (several years)	P.R. Manufacturing Census (and year)
2.	U.S. Bureau of the Census, U.S. Census of Population	
	1960 - Detailed Characteristics Puerto Rico, Wash. D.C., 1962	U.S. Census 1960
	1970 - Detailed Characteristics Puerto Rico. Wash. D.C., 1973	U.S. Census 1970
	1980 - Detailed Characteristics Puerto Rico. Wash. D.C., 1984	U.S. Census 1980
3.	U.S. Bureau of the Census, Economic Census of Outlying Areas	
	1967 - Puerto Rico: Census of Manufacturers Wash. D.C. 1970	U.S. Manufacturing Census 1967
	1972 - Puerto Rico and Census of Manufacturers Wash. D.C. 1980	U.S. Manufacturing Census 1972
	1977 - Puerto Rico Census of Manufacturers Wash. D.C. 1985	U.S. Manufacturing Census 1977
	1982 - Puerto Rico Census of Manufacturers Wash. D.C. 1985	U.S. Manufacturing Census 1982

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I. INTRODUCTION: WOMEN AND INDUSTRIALIZATION - A GENERAL OUTLOOK

Women participate in the labor force in different degrees and forms in different countries. The participation rate is affected by a myriad of factors, including societal attitudes, culture, stereotypes, bias, gender roles embedded in the fabric of the society and the institution of the family, legislation, training and education avenues open to and taken advantage of by women, perception of women themselves as to their attachment to the market work ethic, all of which in some degree or other determine women's participation into the labor force and impede the full exploitation of their capabilities. The impediments get to be removed over the years as a result of interacting developments between the market forces and political, legislative, and social attempts to directly redress the problem of women's employment and economic progress.

Women have stepped up their participation in the labor force in all countries that experienced strong economic growth, especially since they came to earn higher incomes by working outside the home. In the developed countries, throughout the past two or three decades, women have been increasing their participation in the labor market as men have been reducing theirs. Combined with the political activity and the civil rights movements that characterized them in the sixties and the much publicized UN Decade for Women that continues to characterize the international scene, silent market forces have ushered in a greater number of jobs, mostly in the

service industries, and have led to a quiet social revolution which transformed the way men regard women and the way women regard themselves. Changes have taken place which have reduced the occupation segregation of men and women, raised the women's rate of entry into non-traditional operations with the most dramatic changes occurring in the managerial occupations.

The supply of women responds differentially to the changes in demand within specific industries and occupations at different times and stages of development. In the developed countries, for example, when during World War II men were enlisted into the military forces, women took their place at the assembly lines and behind the machines. In many less developed countries the industrialization process was initiated after the war with the establishment of highly labor intensive industries where the work was tailored to the particular skills of women workers (needle-craft, apparel and textiles are examples).

But, as industrialization proceeded, it began to require highly complex processes of production and organization. Management control evolved from simple into highly sophisticated situations. Highly technically trained professionals and operatives and craftsmen came to be required in the production lines and innovative entrepreneurship to absorb and transform know-how into process design, development, commercialization, and adaptation to rapidly changing technologies and circumstances.

The response of women to these changing circumstances cannot be expected to be identical in all countries. With differing religious principles and socialization processes, barriers to entry into so-called traditionally male jobs and the main source of women's low status -- occupational segregation -- can be removed only in differential degrees and ways. Moreover, the supply of educated women with training in the more complex high level skill jobs cannot be expected to respond immediately to the changes in demand. For one, the attitude of women towards these jobs will have to change, i.e. they have to be more willing to accept the responsibilities they entail. Secondly, education and skill acquisition is a time consuming process: availability of the appropriate labor force will lag behind the increase in demand.

But, to the extent that entry does take place, the new characteristics of the female labor force will influence the extent and type of their participation in the job market, affect demand itself, and have an impact on the distribution of demand and on the employment of women in non-traditional jobs.

The future is bound to bring dramatic changes overall. More women will emerge as employers, entrepreneurs, and professionals of a greater variety. More women will be better educated, move into traditionally male occupations, and occupy executive, managerial, administrative, professional, and highly skilled technical jobs. With education fetching increasing premiums in the job market, they will prosper and become more career oriented and raise their preferences of attachment to the labor force. Their success and prosperity are bound to enhance economic growth, especially

since it is the fastest growing industries that feel most comfortable with women in their senior ranks, as the present paper will deomonstrate using one such industry as an example.

II. THE PURPOSE OF THE STUDY

The purpose of this study is to highlight and exemplify these points drawing from the experience of one country with a very high-technology industrial sector. The country is Puerto Rico and the sector the pharmaceutical industry. The study traces the labor force participation record of women in this specific manufacturing branch, its dimension, characteristics, and changes. It analyzes the initiatives that aid the female labor force to strive for and acquire higher skills which enhance their upward mobility.

The study consists essentially of two parts. Part One (Section IV) first takes stock of the past and present situation of the employment of women in the Puerto Rican economy in general and in the pharmaceutical sector in particular. Here use is made of published data from the U.S. Bureau of the Census, P.R. Planning Board, P.R. Dept. of Labor and Human Resources, and P.R. Economic Development Administration. This latter agency is responsible for implementing the strategy of promoting large scale industrialization of the Island. This serves then to analyze the magnitude and the direction of the changes that have taken place.

Part Two (Section V) is a qualitative assessment first of the society's overall consciousness with respect to the enhancement of women's economic progress from the point of view of political, social, and ideological commitment to the goal of parity between the sexes, regardless of the degree to which this parity has been attained. This is followed by an industry-specific analysis which assesses, through informal interviews with officials and personnel of several plants, the experience of the pharmaceutical industry in hiring, training, and promoting women in their manufacturing operations.

The study is exploratory. It is a first step in describing the current situation, bringing out the relevant issues, pinpointing the achievements and the factors that have made them possible and indicating areas requiring improvement, and thereby lays the ground for future investigations which, with the use of more sophisticated quantitative methodologies, can relate women's employment to more specific factors and extend the analysis to other sectors.

In a final section the study draws implications for potential policy measures implementable elsewhere in the world. It is, however recognized that first no two country, developed or developing, can ever be alike; and second that Puerto Rico's political and economic integration into the United States endows it with sui generis legislative, social, political, and economic traits which are not to be found in any other developing country in the world.

III. POLITICAL AND ECONOMIC FEATURES THAT DISTINGUISH PUERTO RICO

For all practical purposes, Puerto Rico is part of the United States, but it is not a federated state or a territory. It is a "freely associated state" which distinguishes it from the independent nations of the industrializing third world. For it has a total economic and political union with the United States which conditions its entire economy in general and its industrial sector in particular in a way fundamentally different from other countries. It has free access to the U.S. market and U.S. financial markets. Capital, labor, and goods move freely between Puerto Rico and the mainland without legal restrictions. Puerto Rico's products are afforded the same tariff and other trade protection or liberalization as are products produced on the mainland. It has full monetary union with the United States; the U.S. dollar is its currency. It has no balance of payments and exchange rate problems in the international sense. It executes no monetary, trade, and exchange policy independent of the United States. In all these respects Puerto Rico's economy functions as that of a State of the Union.

More importantly, Puerto Rico is similar to a state of the Union in yet another respect, and that is the effective application on the Island of most Federal legal statutes and regulatory requirements. Puerto Rico participates in Federal assistance programs provided by all the U.S. Departments and Agencies. Historically, the extent of participation has been high. The change has been progres-

sively towards achievement of a state-like treatment, though outright exclusions, statutory limitations, and differential treatments stand in the way of full parity.[1/]

A significant factor in this connection is the fiscal autonomy the Island enjoys in designing and implementing its own tax system independently from the Federal tax code and hence the exemption of Puerto Rican resident individuals and corporations from Federal income taxes. Thus, although they are U.S. citizens protected both by the U.S. and P.R. Constitutions, following the principle of "no representation without taxation" Puerto Ricans do not vote in U.S. elections. A Resident Commissioner with no floor vote but otherwise vested with all the prerogatives of a Congressman represents the Island in Congress.

Nevertheless, most legal and regulatory statutes that govern economic activity apply equally on the Island. These range from establishing uniform minimum wage standards within the United States, including Puerto Rico, to environmental protection requirements, to regulations governing the production, distribution and movement of goods, and, or particular importance to this study, the employment of people regardless of differences of sex, race, creed, or national origin, as will be discussed subsequently.

1/ Rules of implementation, the magnitude of the funds involved, the coverage of the programs change from year to year. Nevertheless, a 1979 study provides an excellent analysis and inventory of these programs. See U.S. Dept. of Commerce, Economic Study of Puerto Rico, Report to the President prepared by the Interagency Task Force, Washington, D.C.: U.S. Government Printing Office, Dec. 1979, Vol. I, Part Two, pp. 151ff.

Industrialization has been the key strategy instrument in Puerto Rico's development since its effective start-up some three and a half decades ago. The manufacturing sector expanded rapidly and continuously since 1950. From 1950 to 1980 the Island's GDP increased at the annual rate of 9.3% while GDP in manufacturing expanded at the annual rate of 13.2%. Per capita manufacturing output rose 23-fold.

Drastic changes in the industrial structure were inevitable in the process of growth and expansion. In the fifties the supply of labor was relatively large and the wages were low; hence industrial development relied on labor-intensive industries. But successful development raised labor skills through educational advancement, training, and employment. These in turn raised the wage rates, concomitantly with the federally legislated raises in the minimum wage levels under the U.S. Fair Labor Standards Act. When the comparative advantage of labor-intensive industries began to erode, a new era of capital-intensive high-technology industries was ushered in the late sixties. Prominent among them was the pharmaceutical industry whose share in the Islands's net national product rose from 1.9% in 1967 to 36.2% in 1985 and whose share in merchandise exports rose form 10.6% in 1976 to 23.4% in 1985.

The present study purports to assess the crucial role of women in this dramatic growth of the pharmaceutical industry and in turn evaluate the industry's significance for the economic enhancement and prosperity of the female labor force.

IV. THE DRUG AND PHARMACEUTICAL SECTOR IN THE PUERTO RICAN ECONOMY[1/]

1. The Industry

The drug and pharmaceutical industry in Puerto Rico (SIC 283) is primarily engaged in the manufacture, fabrication and processing of medicinal chemicals and pharmaceutical products.[2/]

At present, the drug industry is the largest and most significant subgroup of the chemical and allied products industry (SIC 28) in Puerto Rico.[3/] It accounts for half the establishments in SIC 28, four-fifths of its employment, and nine-tenths of the net value the chemical industry contributes to Puerto Rico's national income.[4/] It also accounts for 80.7% of the chemical industry's shipments, within which the pharmaceutical preparations are the most important component (88.9%).[5/]

1/ Throughout the study the words "pharmaceutical" and "drug" are used interchangeably to denote the same manufacturing subsector.

2/ These include:

Biological products (SIC 2831) such as bacterial and viral vaccines, toxoids and analogous products, including allergenic extracts, serums, plasmas and other blood derivatives for human or veterinary use:

Medicinal chemicals and botanical products (SIC 2833) including the manufacture of bulk organic and inorganic chemicals and their derivatives, and processing (grading, grinding, and milling) of bulk botanical drugs and herbs;

Pharmaceutical preparations (SIC 2834) consisting of products for human or veterinary use largely intended for final consumption, such as tablets, capsules, vials, ointments, and suspensions.

3/ SIC 28 consists of: plastics, synthetics, and resins (282); drugs (283); soaps and cosmetics (284); paints, varnishes, and related products (285); agricultural chemicals (287); industrial inorganic and miscellaneous chemicals (281, 286, 289).

4/ P.R. Manufacturing Census, 1985 and P.R. Planning Board, Income and Product, 1984

5/ U.S. Manufacturing Census, 1982, Table 4

Today, virtually every major U.S. drug and pharmaceutical manufacturer counts with production facilities in Puerto Rico. Non-US companies also have operations on the Island.

The industry benefits substantially from the tax exemptions available to manufacturers in Puerto Rico. Drugs are high-valued products which consist of many exclusive high-volume, high-profit, patented specialties which are marketed mainly in the United States where profits, because of the special treatment recognized under the U.S. Internal Revenue Code, are also exempt from the federal corporate tax. The high volume high profit products constitute also those where most of the U.S. pharmaceutical R & D expenditures are concentrated.

The industry faces the same stringent U.S. Government regulations regarding product safety, efficacy, and marketing. The U.S. Food & Drug Administration, which maintains an office in Puerto Rico, monitors the industry's compliance with drug laws passed by U.S. Congress, and also drug research, testing, development, marketing, and consumption. It inspects manufacturing plants and tests batches of selected drugs to ensure that drug efficacy and safety standards do not violate pertinent U.S. laws. The annual inspections of pharmaceutical manufacturers and distributors by the P.R. Dept. of Health, and other P.R. regulatory provisions, are in addition to the inspection and monitoring by the U.S. Food and Drug Administration.

The industry requires very highly skilled personnel for its operations. It is counted among the top ten high-technology industries in the world. It is estimated that about 40% of the jobs it generates in Puerto Rico are skilled. Many of the positions in what the U.S. Census classifies as the professional and technical occupations (see Appendix IV.1) require a bachelor's degree, at the least, in various branches of engineering, natural sciences, and business administration, in addition to several years of experience, and bilingualism. Some positions call for doctor's degrees. Frequently, even in administrative support occupations a bachelor's degree is required. In contrast, in apparel and textile industries, for example, skilled workers are estimated to make up about 11% of their employment, and in electrical machinery and professional instruments about 24%.[1/]

The industry consists of large scale operations and its size has grown over the years as established plants have been of succesively larger size. Today the number of employees per establishment is 160, over twice the average for all manufacturing, when it was 95 ten years ago. More than 60% of its labor force is employed by 16 establishments with 250 or more employees. Ten years ago 40% of its labor force was in 3 establishments of similar size.[2/]

1/ See "Studies on the Impact of Sophisticated Manufacturing Industries on the Economic Development of Puerto Rico." by Arthur D. Little, Inc. P.R. Business Review, 5:11, Nov. 1980, and 5:12, Dec. 1980.

2/ U.S. Manufacturing Census 1982 and 1972.

The industry offers its production workers stable employment and longer hours per week, should they so desire, with corresponding overtime pay. The average work week was 42.9 hours in 1985, 4.4 hours longer than the manufacturing average. [1/] The high hourly earnings of the production workers make the industry a particularly attractice work place, in addition to its other attractions such as fringe benefits substantially larger than legally mandated, [2/] as well as plant locations in beautiful natural surroundings, clean and hygienic environment, high safety record, etc. The high hourly earnings generate relatively high levels of income and purchasing power for the economy.

2. Output and Employment: An Overall Assessment

The first significant pharmaceutical plant in Puerto Rico was established in 1960. The industry began to expand in the second half of the sixties, but the real thrust came in the seventies (see Table 1).

[1/] P.R. Manufacturing Census, 1985

[2/] Most companies pay the premiums of employee pension plans and group life insurance and contribute substantially to hospitalization and major medical plans of their employees and their dependents. See P.R. Manufacturers Association, Fringe Benefits Survey, 1985, San Juan, Dec. 1985.

Table 1

THE DRUG INDUSTRY - EMPLOYMENT AND OUTPUT

Puerto Rico: 1954-1985

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Number of establishments	28	47	54	58	60	69	72	76	76	77	78	74	74	77	87
Employment	1,074	3,535	4,965	5,449	5,964	7,315	8,369	9,774	10,279	10,978	11,746	11,846	12,327	12,469	13,839
Employment as % of manufacturing employment	0.9	2.4	3.2	3.6	4.4	5.0	5.6	6.3	6.6	7.1	7.8	8.3	8.6	8.2	9.3
Net income ($ million)	49.2	215.8	296.1	366.5	510.5	691.0	731.8	963.1	1,080.2	1,326.0	1,500.3	1,601.0	1,996.1	2,245.3	2,491.8
Net income as % of manufacturing net income	7.4	16.8	19.2	19.6	25.7	27.9	25.8	28.3	27.0	27.6	28.7	29.6	34.8	34.8	36.2
Exports ($ million)	63.0	220.0	240.7	281.6	279.9	362.6	490.7	630.7	883.4	1,053.7	1,174.3	1,428.2	1,524.1	1,492.0	2339.1
Exports as % of total merchandise exports	4.7	11.1	9.5	8.3	8.7	10.6	10.8	12.9	14.3	14.8	14.2	15.8	17.4	15.8	23.4

Sources: U.S. Manufacturing Censuses, 1967 to 1982
P.R. Manufacturing Censuses, various years
P.R. Planning Board, Income and Product, 1984 and unpublished data
P.R. Planning Board, External Trade Statistics and Informe Economico al Gobernador, various years.

In 1967 there were only 28 pharmaceutical establishments [1/] on the Island employing a total of 1,074 persons who made up a mere 0.9% of the total employment in manufacturing. Value added by the industry was about $5 million which represented 7.4% of aggregate value added in manufacturing. Exports of the industry were 4.7% of total exports.

By 1985 there were three times as many establishments employing 14 times as many individuals who made up nearly 10% of all manufacturing employment. Value added by the drug industry had grown 50-fold to $2.5 billion which was more than 3.6% of aggregate value added in manufacturing. Exports of pharmaceutical products now came to represent 23% of the Island's total merchandise exports.

Employment and output expanded vigorously. This development is of particular importance for the Island's economy, since light and labor-intensive industries were constantly losing their competitive edge and were facing output and employment reductions. The pharmaceutical industry, along with a few other high-technology industries, was able to generate sufficient employment and output to prevent manufacturing employment from falling. On the contrary, manufacturing output and productivity rose during 1976-1984.

1/ An establishment may include any number of plants.

When the tobacco, textile, and apparel industries lost 11,162 jobs since 1976, the pharmaceutical industry added 6,524 employees to its payroll. Thus, it "absorbed" close to 60% of the job losses suffered by these three traditional industries. Its real output rose at the annual rate of 9.5%, its employment at 6.3%, and its productivity at 2.9%, when other industries suffered losses on all three counts (see Table 2).

The vigorous rise in employment combined with the relatively high wages and salaries disbursed by the industry generates a high employment and income leverage on the rest of the economy. The industry's employment and income multipliers are among the highest.[1/] The employment multiplier is 4.62, which means that every direct job generated in drug production is estimated to create 3.62 jobs elsewhere in the economy. In other words, 13,839 persons employed in the pharmaceutical industry are estimated to have indirectly generated 50,100 jobs in the remaining sectors of the economy, which is equivalent to 6.6% of employment in 1985. The income multiplier is 2.86, which means that for every million dollar increase in the final demand for the pharmaceutical industry's products additional incomes of $1.86 million can be expected to have been generated in the rest of the economy.

Obviously, the high employment leverage combined with the high income leverage enhances strongly the pharmaceutical industry's direct contribution to the Puerto Rican economy.

1/ P.R. Planning Board, Insumo - Producto 1977. Analisis de Multiplicadores, San Juan, May 1985.

TABLE 2

OUTPUT, EMPLOYMENT, AND PRODUCTIVITY CHANGES
IN INDUSTRY
Puerto Rico: 1976-1984
(Annual percentage change)

	Output a)	Production Workers	Productivity
Food and kindred products	1.8	-0.4	2.0
Tobacco manufacturers	-5.4	-23.2	7.4
Textile mill products	-7.7	-6.5	-2.7
Apparel	1.2	-1.4	2.3
Lumber & wood products	-5.8	-2.5	-3.7
Paper, printing & publishing	1.8	0.03	1.6
Chemical & allied products	7.7	3.2	4.1
Out of which drugs	9.5	6.3	2.9
Stone, clay, glass	-2.9	-4.7	0.9
Primary & fabricated metals	1.1	-4.0	4.6
Machinery, exc. electrical	16.0	10.3	5.7
Electrical machinery	11.3	6.6	3.8
Profl. & sci. instruments	9.4	2.1	6.8
Leather goods	6.0	1.2	5.0
Petroleum refining	10.6	-7.9	8.0
Rubber & plastics	9.5	4.3	4.7
Miscel. industries	9.0	-0.3	9.8
Total	6.7	0.6	5.5

a) Domestic income, deflated by the implicit GDP deflator.

Sources: PR Planning Board, Informe Económico al Gobernador, 1985
PR Planning Board, Ingreso - Producto, 1984
PR Manufacturing Census, 1976 and 1984

3. Women and the Pharmaceutical Industry [1/]

a. Employment

The U.S. Census of 1960 registered 134,260 women, 14 years or older, as employed in Puerto Rico. These represented 24.6% of the Island's total employment. Of these 37,332 (27.8%) were in the manufacturing sector; and within that a mere handful of 112 (0.1%) in pharmaceutical operations. By 1980, the Census records 268,596 women as employed who now represent 36.6% of total employment. Of these 62,789 (23.4%) in manufacturing and 5,659 (2.1%) in the pharmaceutical sector.

1/ Sources for employment and related data are U.S. Population Censuses, the Labor Statistics Bureau of the P.R. Dept. of Labor and Human Resources, and U.S. Manufacturing Surveys. The last does not distinguish employment as between genders and does not provide earnings data. The second gives the gender breakdown of total employment in manufacturing industries, but not of production workers. Also their earnings data refer to production workers only and again do not distinguish between sexes. The U.S. Population Censuses are the most detailed in distinguishing the various characteristics of the labor force, but the many components required for the analysis are not readily available. In fact published information is being provided in more and more condensed form and access to data can only be obtained through computer tapes.

Each source uses different data compilation techniques. The population census is based on household surveys, some through personal interviews and some through mail questionnaires. The detailed industrial employment and related information of the PR Dept. of Labor is obtained by means of a canvas of manufacturing establishments by the Bureau's field force. The US Manfacturing surveys are also by establishment. Consequently, the three data sources do not yield the same results and magnitudes with respect to employment and other characteristics of the labor force.

Several important changes can be read from these figures:

i- Women's employment doubled from 1960 to 1980.

ii- Women raised their share in total employment by 12 percentage points; consequently men's share declined.

iii- Female employment in manufacturing rose by 67%, which means that in other economic sectors women's employment rose much more drastically.

iv- Women's employment in the drug industry increased by 6 times between 1970 and 1980.

A summary of the Census totals is presented in Table 3 and indices of employment growth in Table 4. Relatively more women than men were employed in the Puerto Rican economy as a whole, in the manufacturing sector, and in chemicals and drugs. From 1960 to 1980 women doubled their aggregate employment while men's employment increased by 12%; women's employment in manufacturing gained by 67%, while men's gained by 45%; women's employment in the drug industry in 1980 was about 50 times its level in 1960, while men's was about 30 times. However, since 1970, when the drug industry began to expand vigorously, employment of men and women gained by approximately the same rate with men's employment gaining somewhat over that of women.

The growing importance of women in employment can be expressed in yet another way. Of the total net increase of 88,205 jobs between 1960 and 1970[1/] the lion's share (70%) had gone to women and only

1/ It should be noted that the Census changed the definition of experienced civilian labor force in 1970. In 1960 this labor force comprised individuals 14 years or older; in 1970 it comprised individuals 16 years or older.

Table 3

EMPLOYED PERSONS BY INDUSTRY
Puerto Rico: 1950, 1960, 1970 and 1980

	1950		1960		1970		1980	
	Male	Female	Male	Female	Male	Female	Male	Female
Total[(a)]	428,868	131,288	416,740	134,916	438,965	195,956	465,326	268,596
Manufacturing	40,932	51,607	56,516	37,604	73,040	58,004	82,147	62,789
Chemicals	879	79	1,588	276	3,849	1,652	12,428	6,469
Drugs	67	24	284	112	1,258	925	8,333	5,513

a) 1950 and 1960 : persons 14 years and over.
1970 and 1980 : persons 16 years and over.

Source: US Census 1960, Table 106; 1980, Table 124.

Table 4

INDICES OF EMPLOYMENT GROWTH BY INDUSTRY AND SEX
Puerto Rico: 1950, 1960, 1970, and 1980
(1960 = 100)

	Total		Manufacturing		Chemicals		Drugs	
	Male	Female	Male	Female	Male	Female	Male	Female
1950	102.9	97.3	72.4	52.8	55.3	28.6	23.6	21.4
1960	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1970	105.3	145.2	129.2	154.2	242.4	598.6	443.0	825.9
1980	111.7	199.1	145.4	167.0	782.6	2343.8	2934.2	4922.3

Source: See Table

only 30% to men. And of the net 98,961 jobs gains between 1970 and 1980 even a larger proportion (73.4%) went to women.

The employment in the pharmaceutical industry is given in Table 5 which is compiled from P.R. Manufacturing Censuses. Over the past 15 years women represented on the average about 38% of the industry's employment. In other words, employment of men and women has risen at about the same rate. However, P.R. Manufacturing Census data do not allow the distinction of female employment or even male employment for that matter, among different types of jobs or occupations. Hence, in subsequent sections the assessment of the shift of women among occupations and other characteristics of female employment in the drug industry relies on information on female employment in general, and in the chemical industry in particular, provided by the U.S. Censuses. The chemical industry's use is justified in that according to the P.R. Manufacturing Census employment in the drug industry accounts for 80% of the employment in the chemical industry; and according to the U.S. Census the ratio is 74%. Hence, it is reasonable to assume that the employment and related characteristics of the female work force of the chemical industry are determined to a large extent by the characteristics in the drug industry. Moreover, the ratio of women employed in chemical industry to total employment in the same is identical at 36% in both sources. Also the women in the drug industry represent about 85% of women in the chemical industry in both sources.

Table 5

EMPLOYMENT IN THE DRUG INDUSTRY
Puerto Rico: 1960-1985

	Total	Male	Female	% Female
1960	495	304	191	38.6
1965	698	409	289	41.4
1968	1,566	803	763	48.7
1969	1,662	882	780	46.9
1970	1,938	1,087	851	43.9
1971	2,962	1,808	1,154	39.0
1972	3,535	2,331	1,204	34.1
1973	4,996	2,833	1,663	37.0
1974	5,332	3,421	1,911	35.8
1975	5,842	3,695	2,147	36.8
1976	7,315	4,542	2,773	37.9
1977	8,369	5,160	3,209	38.3
1978	9,774	5,859	3,915	40.1
1979	10,279	6,235	4,044	39.3
1980	10,978	6,739	4,239	38.6
1981	11,746	7,297	4,449	37.9
1982	11,846	7,473	4,373	36.9
1983	12,327	7,762	4,565	37.0
1984	12,469	7,826	4,643	37.2
1985	13,839	8,654	5,185	37.5

Source: P.R. Manufacturing Census, various years.

b: Occupations [1/]

Prior to the massive industrialization process women in general participated in low wage and low productivity activities -- needlework, domestic service, family farm work -- and other "traditionally female" occupations -- nurses, teachers, secretaries. The new occupational alternatives that became available after 1950 made women opt for a new tool in order to raise their competitive edge in the labor market: education. Simultaneously, the new industries began to offer employment opportunities for women. The result was an increase in the share of women in total employment, as discussed in the previous section, as well as a structural shift in the occupations women began to perform.

The occupational structure of persons employed in 1960, 1970, and 1980 by industry and sex is given in Tables 6, 7, and 8. Of the 37,332 women employed in the manufacturing sector in 1960, the overwhelming majority (87.3%) worked as operatives. But since the chemical industry was very much in its infancy with minimal pharmaceutical operations, only 0.3% of them were located in the chemical industry. Not even 2% of women in manufacturing were employed as managers and professional workers. Yet 11% of the professional and technical workers were in the chemical industry.

1/ For the summary of the approximate content of the global occupational categories see Appendix I.

Table 6

EMPLOYED PERSONS: OCCUPATION BY INDUSTRY AND SEX
Puerto Rico: 1960

	Total		Manufacturing		Chemicals		Drugs
	Number	%	Number	%	Number	%	Number
All individuals, 14 yrs +	546,756	100.0	93,312	100.0	1,856	100.0	396
Exec., Adm., Mngr.	57,884	10.6	3,680	3.9	128	6.9	n.a.
Profl. & Techl.	42,956	7.9	2,000	2.1	116	6.3	n.a.
Sales	34,712	6.3	2,552	2.7	152	8.2	n.a.
Clerical	42,568	7.8	5,052	5.4	240	12.9	n.a.
Service	61,084	11.2	1,924	2.1	96	5.2	n.a.
Precision & Crafts	60,200	11.0	14,996	16.1	224	12.1	n.a.
Operatives	98,324	18.0	57,388	61.5	708	38.1	n.a.
Laborers	141,760	25.9	5,532	5.9	184	9.9	n.a.
Occupation n.a.	7,268	1.3	188	0.2	8	0.4	n.a.
Employed females, 14 yrs. +	134,260	100.0	37,332	100.0	276	100.0	112
Exec., Adm., Mngr.	5,512	4.1	348	0.9	16	5.8	n.a.
Profl. & Techl.	20,284	15.1	212	0.6	24	8.7	n.a.
Sales	6,248	4.7	164	0.4	16	5.8	n.a.
Clerical	22,164	16.5	2,096	5.6	104	37.7	n.a.
Service	33,780	25.2	204	0.5	4	1.4	n.a.
Precision & Crafts	1,900	1.4	1,372	3.7	4	1.4	n.a.
Operatives	38,432	28.6	32,576	87.3	108	39.1	n.a.
Laborers	2,376	1.8	316	0.8	..	..	..
Occupation n.a.	3,564	2.7	44	0.1	..	..	..
Employed males, 14 yrs. +	412,496	100.0	55,980	100.0	1,580	100.0	284
Exec., Adm., Mngr.	52,372	12.7	3,332	6.0	112	7.1	n.a.
Profl. & Techl.	22,672	5.5	1,788	3.2	92	5.8	n.a.
Sales	28,464	6.9	2,388	4.3	136	8.6	n.a.
Clerical	20,404	4.9	2,956	5.3	136	8.6	n.a.
Service	27,304	6.6	1,720	3.1	92	5.8	n.a.
Precision & Crafts	58,300	14.1	13,624	24.3	220	13.9	n.a.
Operatives	59,892	14.5	24,812	44.3	600	38.0	n.a.
Laborers	139,384	33.8	5,216	9.3	184	11.6	n.a.
Occupaton n.a.	3,704	0.9	144	0.3	8	0.5	n.a.

Source: U.S. Census 1960, Table 110

Table 7

EMPLOYED PERSONS: OCCUPATION BY INDUSTRY AND SEX
Puerto Rico: 1970

	Total		Manufacturing		Chemicals		Drugs
	Number	%	Number	%	Number	%	Number
All individuals, 16 yrs. +	634,961	100.0	131,039	100.0	5,102	100.0	2,183
Exec., Adm., Mngr.	45,137	7.1	4,004	3.1	288	5.6	n.a.
Prof.. & Techl.	75,263	11.9	4,104	3.1	571	11.2	n.a.
Sales	47,211	7.4	3,056	2.3	313	6.1	n.a.
Clerical	77,093	12.1	8,531	6.5	645	12.6	n.a.
Service	81,218	12.8	3,694	2.8	218	4.3	n.a.
Precision & Crafts	95,224	15.0	22,389	17.1	764	15.0	n.a.
Operatives	124,779	19.6	78,003	59.6	2,004	39.2	n.a.
Laborers	41,928	6.6	7,163	5.5	295	5.8	n.a.
Farming	47,108	7.4	95	0.1	4	..	n.a.
Employed females, 16 yrs +	195,963	100.0	57,997	100.0	1,517	100.0	925
Exec., Adm., Mngr.	6,753	3.4	357	0.6	30	2.0	n.a.
Profl. & Techl.	36,287	18.5	693	1.2	130	8.6	n.a.
Sales	10,597	5.4	311	0.5	70	4.6	n.a.
Clerical	45,355	23.1	4,589	7.9	420	27.7	n.a.
Service	36,543	18.6	429	0.7	15	1.0	n.a.
Precision & Crafts	5,926	3.0	3,992	6.9	43	2.8	n.a.
Operatives	51,303	26.2	46,275	79.8	770	50.8	n.a.
Laborers	2,124	1.1	1,348	2.3	39	2.6	n.a.
Farming	1,075	0.5	3	..	-	-	-
Employed males, 16 yrs. +	438,998	100.0	73,042	100.0	3,585	100.0	1,258
Exec., Adm., Mngr.	38,384	8.7	3,647	5.0	258	7.2	n.a.
Profl. & Techl.	38,976	8.9	3,411	4.7	441	12.3	n.a.
Sales	36,614	8.3	2,745	3.8	243	6.8	n.a.
Clerical	31,738	7.2	3,942	5.4	225	6.3	n.a.
Service	44,675	10.2	3,265	4.5	203	5.7	n.a.
Precision & Crafts	89,298	20.3	18,397	25.2	721	20.1	n.a.
Operatives	73,476	16.8	31,728	43.4	1,234	34.4	n.a.
Laborers	39,804	9.1	5,815	8.0	256	7.1	n.a.
Farming	46,033	10.5	92	0.1	4	0.1	n.a.

Source: U.S. Census, 1970, Table 145.

Table 8

EMPLOYED PERSONS: OCCUPATION BY INDUSTRY AND SEX
Puerto Rico: 1980

	Total		Manufacturing		Chemicals		Drugs	
	Number	%	Number	%	Number	%	Number	%
All individuals, 16 yrs. +	733,922	100.0	144,936	100.0	18,897	100.0	13,972	100.0
Exec., Adm., Mngr.	61,542	8.4	8,510	5.8	1,634	8.6	1,015	7.3
Profl. & Techl.	102,670	14.0	5,816	4.0	1,813	9.7	1,455	10.4
Sales	73,839	10.1	4,228	2.9	549	2.9	314	2.2
Clerical	110,227	15.0	11,004	7.6	2,047	10.8	1,355	9.7
Service	106,986	14.6	5,436	3.8	1,110	5.9	808	5.8
Precision & Crafts	92,021	12.5	25,481	17.6	3,419	18.1	2,344	16.8
Operatives	116,709	15.9	74,049	51.1	6,895	36.5	5,518	39.5
Laborers	44,452	6.1	10,283	7.1	1,413	7.5	1,146	8.2
Farming	25,476	3.5	129	..	17	0.1	17	0.1
Employed females, 16 yrs. +	268,596	100.0	62,789	100.0	6,595[a]	100.0	5,659[a]	100.0
Exec., Adm., Mngr.	16,119	6.0	1,488	2.4	281	4.2	192	3.4
Profl. & Techl.	56,604	21.1	1,467	2.4	488	7.4	441	7.8
Sales	20,431	7.6	708	1.1	74	1.1	40	0.7
Clerical	72,122	26.9	6,444	10.3	1,352	20.5	973	17.2
Service	43,496	16.2	441	0.7	86	1.3	85	1.5
Precision & Crafts	8,315	3.1	5,812	9.3	479	7.3	357	6.3
Operatives	46,060	17.1	43,081	68.6	3,228	49.0	2,999	53.0
Laborers	4,602	1.7	3,348	5.3	607	9.2	572	10.1
Farming	847	0.3	-	-	-	-	-	-
Employed males, 16 yrs +	465,326	100.0	82,147	100.0	12,302[a]	100.0	8,313[a]	100.0
Exec., Adm., Mngr.	45,423	9.8	7,022	8.5	1,353	11.0	823	9.9
Profl. & Techl.	46,066	9.9	4,349	5.3	1,325	10.8	1,014	12.2
Sales	53,408	11.5	3,520	4.3	475	3.9	274	3.3
Clerical	38,105	8.2	4,560	5.6	695	5.7	382	4.6
Service	63,490	13.6	4,995	6.1	1,024	8.3	723	8.7
Precision & Crafts	83,706	18.0	19,669	23.9	2,940	23.9	1,987	23.9
Operatives	70,649	15.2	30,968	37.7	3,667	29.8	2,519	30.3
Laborers	39,850	8.6	6,935	8.4	806	6.5	574	6.9
Farming	24,629	5.3	129	0.2	17	0.1	17	0.2

Source: US Census 1980, Table 122 and 5% sample.

a) Because it has been estimated from the 5% sample of the Census data, the figure differs in a minuscule way from that contained in Table 122 and in Table 124.

But, by 1970 a significant transformation occurred in the jobs women came to perform. A greater number of them, absolutely and relatively, began to function as craftsmen and foremen especially in the manufacturing sector; and these occupations are considered to embody higher skills than operatives. Almost six times as many women were now employed in the chemical industry due mainly to the beginning of large scale pharmaceutical operations in the latter half of the sixties. There now were 5.5 times as many professional and technical workers in the chemical industry, and executives and managers doubled in number.

The 1980 Census documented yet further the significant change in women's employment pattern and structure towards more white collar, high skill, and high remuneration occupations of managers, executives, professionals, technicians and supervisors. In fact, the structural transformation in Puerto Rico's economy towards higher capital intensity, high technology industries with requirements of training and education intensive skills altered the occupational structure of both genders. About the same number of men were employed as craftsmen, operatives and kindred workers in the manufacturing sector in 1980 as in 1970, but twice as many were executives and managers. A similar phenomenon is also observed in women's employment in manufacturing there were about 2,000 more in precision and craft occupations but about 3,200 less working as operatives. Yet four times as many (1,488) were executives and managers, and more than twice as many were active in professional,

technical, and supervisory capacity. 15.2% of women were employed in so-called skilled positions (management, professionals, sales, and precision and crafts) as opposed to 9.2% in 1970. It is also interesting to note that a greater percentage of women entered clerical and administrative support positions.

The change was even more dramatic in the chemical industry. The 1960 Census had recorded a mere 16 women in the managerial occupations of this industry. By 1970 their number had risen to 30, and by 1980 to 281. The number of professional women jumped from 24 in 1960 to 488 in 1980. There were also sharp increases in the number of clerical and administrative personnel, though their relative importance in the industry's female employment declined. Women in precision and crafts occupation increased their strength absolutely and relatively.

The overwhelming majority of all employment in the chemical sector stems from the drug industry which accounts for 75-80% depending upon the data base used. The occupational structure in the drug industry revealed a similar pattern to that of the chemical industry for both males and females. The distinguishing feature of the pharmaceuticals vis-a-vis the chemical industry, however, was that a greater proportion of men were active in professional and technical occupations and a greater proportion of women worked as operatives. Moreover, while 25.4% men were in the management, professional and sales categories, only 11.9% of women were active

in them. Also the overwhelming proportion of the female labor force in the drug industry (70.2%) consisted of administrative support staff and operatives when the proportion was only 34.9% for men. Again a greater proportion of men (23.9%) were in precision and crafts as opposed to 6.3% of women.

In short, women in the pharmaceutical industry have made significant inroads into otherwise "traditionally male" denominated occupations. The achievements are to be noted more in the dramatic increase in their absolute numbers in certain occupations rather than in the employment proportions. No doubt, the numbers reflect both the phenomenal growth of the drug industry since the late 1960s, as well as the greater participation of women in the labor force and their upward mobility among the occupational ranks by means of higher levels of educational achievement, legislative action and other pertinent factors, among the occupational ranks. This can be seen from Table 9 which gives the change over time in the proportion of women employed in various occupations. Once again the change in the chemical industry is used as proxy in the absence of historical data on the pharmaceutical industry.

It is to be noted that women increased their share in all the global occupational categories in the chemical industry. In the executive, administrative, and managerial positions their share rose from 12.5% in 1960 to 17.2% in 1980. In the pharmaceuticals female managers, administrators and executives were almost one-fifth of the total. Even more dramatic has been the change in the proportion of women in education-intensive professional and technical

Table 9

PROPORTION OF FEMALE EMPLOYMENT IN OCCUPATIONS
Puerto Rico: 1960, 1970, 1980
(%)

	1960			1970			1980			
	Total	Mfg.	Chem.	Total	Mfg.	Chem.	Total	Mfg.	Chem.	Pharm.
All Occupations	24.6	40.0	14.9	30.9	44.3	29.7	36.6	43.3	34.9	40.5
Exec., Adm., Mgr.	9.5	9.5	12.5	15.0	8.9	10.4	26.2	17.5	17.2	18.9
Prof'l & Tech'l	47.2	10.6	20.7	48.2	16.9	22.8	55.1	25.2	26.9	30.3
Sales	18.0	6.5	10.5	22.4	10.2	22.4	27.7	16.7	13.5	12.7
Clerical	52.1	41.5	43.3	58.8	53.8	65.1	65.4	58.6	66.0	71.8
Service	55.3	10.6	4.2	45.0	11.6	6.9	40.7	8.1	7.8	10.5
Precision & Crafts	3.2	9.1	1.8	6.2	17.8	5.6	9.0	22.8	14.0	15.2
Operatives	39.0	56.8	15.3	41.1	59.3	38.9	39.5	58.2	46.8	54.3
Laborers	1.7	5.7	-	5.1	18.8	13.2	10.4	32.6	43.0	49.9

Source: U.S. Census 1960, Table 110 ; 1970, Table 145; and 1980, Table 122 & 5% sample .

occupations, which in most cases require a college education at the least, and in some others further advanced educational degrees. In 1960, women occupied 20.7% of such occupations inthe chemical industry; in 1980 their share was 26.9%. In the pharmaceutical industry the share is even higher with 30.3%. Women also have come to represent higher percentages of clerical and administrative support staff which with widespread computerization and increasingly innovative techniques have come to require higher (i.e. more years of) training and education. Finally, women have increased their presence as operators, assemblers and inspectors, particularly in the manufacture of drugs and medicines where they represent 93% of all the female operatives in the chemical industry.

c: Education and Age

Judged by the number of years of schooling completed, both men and women in Puerto Rico are better educated in 1980 than in 1970. By the same criterion women are better educated than men. Overall a greater proportion of women than men are high school graduates, and except for service workers, a greater proportion of them counts with higher levels of education, occupation per occupation (see Table 10). This phenomenon may have one of its explanations, among many, that men, as breadwinners, traditionally join the labor force at an earlier age than women who then can afford the "leisure" of attending more years of school even if in the end they may opt not to be attached to the labor force. Since, however, female labor force participation rates have risen over the years

Table 10

EMPLOYED PERSONS BY OCCUPATION, EDUCATION, AND SEX
Puerto Rico: 1970 and 1980

	1970				1980			
	Years of Schooling[a]			% High School	Years of Schooling			% High School
	12	13-15	16+	Graduates	12	13-15	16+	Graduates
Males: All Occupations	92,292	32,258	37,039	36.8	133,557	60,325	65,665	55.8
Exec., Adm., Mngrl.	9,561	5,863	8,218	61.6	9,265	10,775	19,597	87.3
Profl. & Techl.	5,981	7,853	21,644	91.0	6,774	8,189	27,773	92.3
Sales	9,652	3,752	2,216	42.7	16,449	10,083	5,978	60.9
Clerical	13,504	6,430	2,108	69.4	14,575	10,639	5,277	80.0
Service	12,160	1,585	409	31.7	21,396	5,581	1,893	45.5
Precision & Crafts	20,405	4,030	1,682	29.2	29,622	7,860	3,431	48.9
Operatives	15,860	1,840	302	24.5	23,149	4,556	861	40.4
Farming	1,606	404	312	5.1	2,309	624	387	13.5
Laborers	3,563	501	148	10.6	10,018	2,018	468	31.4
Females: All Occupations	59,068	28,456	23,521	56.6	83,108	55,457	57,253	72.9
Exec., Adm., Mngrl.	1,460	909	2,145	66.9	3,005	3,821	7,886	91.3
Profl. & Techl.	4,656	11,705	17,718	93.9	5,474	12,766	35,846	95.7
Sales	4,103	914	337	50.5	8,277	3,997	1,656	68.2
Clerical	24,439	12,315	2,564	86.7	30,461	26,562	9,540	92.3
Service	6,166	1,082	361	20.8	12,266	3,815	1,123	39.6
Precision & Crafts	2,035	388	228	44.7	3,008	930	541	53.9
Operatives	15,610	1,075	136	32.8	18,661	3,076	474	48.2
Farming	52	7	27	8.0	102	85	50	28.0
Laborers	547	61	5	28.9	1,854	405	137	52.1

a) 12: completed high school; 13-15: 3 years of college; 16+: Completed college and plus.

Source: US Census 1970, Table 144; 1980, Table 121.

and since especially married women doubled their participation rates from 1960 to 1970,[1/] it is fairly reasonable to infer an attitude change towards permanent attachment to the labor market.

Table 10 shows the inroads made by women with college degrees (16 years +) into managerial occupations where they came to represent 40.2% of the males in the same occupations in 1980 as opposed to 26.1% in 1970. They have increased their prevalence over men in clerical and administrative support occupations where they outnumber men almost two to one. These latter posts have come to require at least a college degree at the bachelor's level in secretarial sciences, electronic data processing, and similar disciplines.

The pattern in the pharmaceutical industry is somewhat different (see Table 11). Overall the proportion of women with at least a high school degree is only slightly higher than that of men. But in almost all the occupations the proportion of women with only a high school degree is higher than that of men, with the exception of precision and craft operations where women tend to have more years of schooling, and the proportion of women with at least a college degree is higher. It is impossible to gauge how women have fared over the years in the pharmaceutical industry, since the same table could not constructed for 1970. But the 1980 Census data reveal three significant features with respect to the employment of women in the drug industry.

i- Overall, women in the drug industry have more years of schooling than women in the labor force as a whole;

1/ 17.9% of married women, spouse present, were in the labor force in 1960; in 1980 the rate was 36.0%. See U.S. Census 1960, Table 97; and 1980, Table 113.

Table 11

EMPLOYED PERSONS IN THE DRUG INDUSTRY BY OCCUPATION AND LEVEL OF EDUCATION
Puerto Rico: 1980
(% Distribution)

	Years of Schooling				
	1-8	9-11	12	13-15	16+
Males: All Occupations	9.2	11.7	41.0	18.3	19.8
Exec., Adm., Mngr.	-	2.6	12.8	17.9	66.7
Profl. & Techl.	-	-	25.0	27.1	47.9
Sales	-	7.7	7.7	23.1	61.5
Clerical	5.6	11.1	33.3	38.9	11.1
Service	38.2	14.7	35.3	8.8	2.9
Precision & Crafts	5.3	12.8	53.2	13.8	14.9
Operatives	10.9	16.0	54.6	16.8	1.7
Laborers	11.1	22.2	37.0	22.2	7.4
Females: All Occupations	7.1	11.9	48.5	19.8	12.7
Exec. Adm. Mngr.	-	-	22.2	11.1	42.9
Profl. & Techl.	-	4.8	38.1	14.3	42.9
Sales	-	-	50.0	-	50.0
Clerical	4.3	2.2	39.1	39.1	15.2
Service	25.0	50.0	-	25.0	-
Precision & Crafts	-	-	41.2	23.5	35.3
Operatives	7.7	15.5	58.5	14.8	3.5
Laborers	18.5	22.2	40.7	18.5	-

Source: U.S. Census, 1980, 5% Sample

ii- A smaller proportion of women in the drug industry has college or more years of education than men overall, but especially in the management and professional and technical levels.

iii- While the higher proportion of men with college degree or more in white collar professions is higher than their overall proportion in these occupations, that of women is the reverse. For example, 42.9% of professional and technical women in the drug industry had at least a college degree, if not more, while the proportion was 63.3% for all women in such occupations. The proportions are 42.9% and 48.9%, respectively, in managerial occupations.

This leads one to the inference that although women have come to be employed in increasingly large numbers by the drug industry, and although women have made great strides towards performing high-level management activities and education and training intensive professional and technical occupations, they have tended to exercise their skills more in service producing sectors, such as banking, finance and insurance, self-employed professionals and especially the government rather than in the material goods producing sectors, such as the drug industry.

There are however occupational differences among the commodity producing sectors themselves. Table 12 reveals the educational pattern of employment in the apparel, paper and printing industries, and Table 13 that of the durable goods producing sector in contrast to the drug industry. The apparel industry exemplifies labor-intensive operations on the Island and the durable goods sector is a conglomerate of 6 SIC categories which includes electrical

Table 12

EMPLOYED PERSONS IN APPAREL, PAPER, AND PRINTING INDUSTRIES
BY OCCUPATION AND LEVEL OF EDUCATION
Puerto Rico: 1980
(% Distribution)

	Years of Schooling					
	0	1-8	9-11	12	13-15	16+
Males All Occupations	1.0	21.5	22.8	36.4	11.0	7.2
Exec., Adm., Mngr.	2.1	4.3	6.4	31.9	21.3	34.0
Profl. & Techl.	-	16.7	12.5	33.3	20.8	16.7
Sales	4.3	13.0	17.4	26.1	21.7	17.4
Clerical	-	14.6	14.6	43.9	22.0	4.9
Service	4.5	72.7	18.2	4.5	-	-
Precision & Crafts	-	11.5	26.0	45.8	11.5	5.2
Operatives	1.0	25.3	28.3	37.9	5.6	2.0
Laborers	-	37.5	28.1	28.1	6.3	-
Females All Occupations	1.0	32.3	22.4	36.4	5.8	2.1
Exec., Adm., Mngr.	-	14.3	14.3	14.3	14.3	42.9
Profl. & Techl.	-	11.1	44.4	-	11.1	33.3
Sales	-	11.1	22.2	11.1	22.2	33.3
Clerical	-	7.5	9.4	39.6	35.8	7.5
Service	33.3	33.3	-	33.3	-	-
Precision & Crafts	-	21.7	21.7	50.0	6.7	-
Operatives	1.0	35.2	23.5	36.2	3.5	0.7
Laborers	3.1	31.3	15.6	37.5	9.4	3.1

Source: U.S. Census 1980, 5% sample.

Table 13

EMPLOYED PERSONS IN DURABLE GOODS INDUSTRIES
BY OCCUPATION AND LEVEL OF EDUCATION
Puerto Rico: 1980
(% Distribution)

	Years of Schooling					
	0	1-8	9-11	12	13-15	16+
Males All Occupations	0.9	19.5	18.6	35.8	14.0	11.2
Exec., Adm., Mngr.	-	5.3	6.0	22.7	18.0	48.0
Profl. & Techl.	-	2.6	9.1	19.5	26.0	42.9
Sales	-	4.7	2.3	55.8	16.3	20.9
Clerical	-	6.0	10.4	38.8	31.3	13.4
Service	4.5	45.5	18.2	25.8	4.5	1.5
Precision & Crafts	0.9	16.1	17.7	39.8	16.8	8.6
Operatives	1.0	25.0	24.5	38.0	9.8	1.7
Laborers	1.0	32.3	25.3	34.3	6.1	1.0
Females All Occupations	0.2	12.6	16.9	50.8	14.7	4.9
Exec., Adm., Mngr.	-	-	8.0	20.0	20.0	52.0
Profl. & Techl.	-	-	13.6	54.5	18.2	13.6
Sales	-	14.3	-	57.1	14.3	14.3
Clerical	-	1.7	5.0	49.6	33.6	10.1
Service	12.5	50.0	12.5	-	12.5	12.5
Precision & Crafts	-	13.2	15.1	49.1	16.0	6.6
Operatives	0.2	15.0	20.4	52.9	10.2	1.3
Laborers	-	13.2	15.1	52.8	17.0	1.9

Source: US Census, 1980, 5% sample.

machinery, electronic equipment, and scientific instruments. These last three generate about 25% of the Island's total manufacturing employment.

The differential pattern of occupational employment is more obvious in the case of men than of women. In all occupations the proportion of highly educated men is much higher in the drug industry than in the other two industry groups. There is also a remarkable difference in the attained educational levels of the female pharmaceutical labor force: the proportion of women with at least a college degree is higher in the drug industry than in the other two. The comparison asserts the drug industry's requirement of higher skills and higher educational levels in several phases of its operations.

The median age of employed persons by industry is given in Table 14. Two distinguishing features can be read from it:

i- Women in the labor force are younger than men: overall in manufacturing; and in the chemical and drug industry.

ii- The median age of employed men has declined somewhat over the years, while that of employed women has increased by a few years, but more so in manufacturing and in the chemical industry.

Behind the change in the median ages over the years lies the shift in the importance of age groups in the male and female labor force. The figures are too tedious to reproduce here. But the

Table 14

MEDIAN AGE OF EMPLOYED PERSONS BY INDUSTRY AND SEX
Puerto Rico: 1960, 1970, 1980

	1960	1970	1980
Employed Males	38.3	37.7	36.5
in Manufacturing	35.4	33.9	34.6
in Chemicals	35.4	32.1	32.8
in Drugs	n.a.	n.a.	31.7
Employed Females	32.0	32.4	33.7
in Manufacturing	29.0	29.9	33.2
in Chemicals	27.1	28.4	30.5
in Drugs	n.a.	n.a.	30.1

Source: US Census 1960, Table 108; 1970, Table 149; 1980, Table 128 and 5% sample.

detailed data from the Censuses reveal that the proportion of men in the chemical industry between 25 and 34 years of age has increased from 1970 to 1980, while the proportion of 20-24 year old women declined sharply at the same time that proportion of 30-34 year old ones increased dramatically. 1/ The change leads to the inference--which is consistent with explanations so far on the employment characteristics of women -- that more women have opted for longer years of education and have entered the labor force at a later age than previously. And this was the case in manufacturing, but especially in the chemical and allied products industry, which includes the pharmaceuticals, with their offering of positions requiring higher skills and more years of education and training.

d: Earnings

The chemical industry, including drugs, is one of the highest paying among all manufacturing operations. The average hourly earnings received by its production workers is surpassed only by those working in petroleum refining, whose employment, however, is only one-tenth that of the drug industry. Table 15 compares the hourly earnings of production workers in selected manufacturing operations in Puerto Rico. 2/

1/ See U.S. Census 1970, Table 149; and 1980, Table 128.

2/ The P.R. Dept. of Labor and Human Resources is the source of earnings data. The information is global. Distinction is not made between male and female workers. Moreover information on incomes of non-production workers is not provided. The Department has recently begun to conduct surveys on men's and women's salaries and occupations in economic sectors. So far results are available for the transportation, public utility, and wholesale and retail trade sectors. See, Encuesta de Salarios por Ocupacion para las Industrias de Transportacion y Utilidades Publicas, Comercio al por Mayor y Comercio al Detal, San Juan 1983. The study on manufacturing is still in the making.

Table 15

a/

AVERAGE HOURLY EARNINGS IN MANUFACTURING
Puerto Rico: 1985

Industrial Sector	Average Hourly Earnings ($)
Petroleum Refining	9.67
Pharmaceuticals	7.36
Newspaper and magazine publishing	7.35
Beverages	6.30
Tobacco	5.60
Sci. Instruments	5.54
Elec.'l Mach. and Electronic equip.	5.42
Metal products	5.30
Food Processing	5.19
Paper products	5.12
Stone, clay and glass	5.05
Textiles	4.40
Leather goods	4.16
Apparel	3.94
Wood products	3.91
Manufacturing average	5.15

a/ Of production workers. Earnings are gross of deductions for old age insurance, advance payments, group insurance, union dues, but exclude irregular bonuses, retroactive items, payments for welfare benefits, payroll taxes paid by employees. The reflect changes in the basic hourly wage rate as well as premium pay for overtime and late shift work.

Source: P.R. Manufacturing Census, 1985.

Table 16 summarizes the change in the earnings of men and women as compiled from the U.S. Censuses. It indicates the median earnings in different occupations in 1960, 1970, and 1980. Table 17 contains information on median earnings by industry, in manufacturing in general and the drug industry in particular. A comparison of the median earnings of men and women, as reflected in Table 16 leads to the general conclusion that male earnings have on the whole risen slightly faster than female earnings from 1960 to 1980, but that women have experienced a higher increase, albeit slight, since 1970, with the exception of professionals in which, however, their earnings had risen twice as fast as those of men between 1960 and 1970.

With respect to developments in the manufacturing vis-a-vis the economy as a whole, a brief reflection based on the figures of Table 17 leads one to conclude that earnings of both genders employed in manufacturing have risen somewhat slower than the increase in the average for the economy as a whole. Although men's earnings in the chemical industry have risen at about the same rate as those in manufacturing as a whole, the growth in women's earnings in the chemical industry has fallen behind. Table 17 reiterates once again the relatively high pay in chemical and the drug industry vis-a-vis manufacturing as a whole. But it also shows that as a simple average women's earnings fall some 20% behind those of men in the chemical and the drug industry.

Table 16

MEDIAN EARNINGS BY OCCUPATION AND SEX
Puerto Rico: 1960, 1970, 1980
(US dollars)

	1960		1970		1980	
	Male	Female	Male	Female	Male	Female
All occupations	$1,105	$1,125	$2,827	$2,567	$5,744	$5,505
Exec., Adm., Mgr.	2,280	1,809	5,508	4,085	11,283	8,586
Profl. & Techl.	3,332	2,138	6,034	7,166	9,248	7,386
Sales	1,305	987	2,980	2,158	6,377	4,450
Clerical	2,080	1,843	3,715	3,141	6,681	5,990
Service	1,272	749	2,695	1,805	5,136	3,665
Precision & Crafts	1,492	1,721	2,936	2,621	5,468	5,449
Operatives	1,339	923	2,658	2,192	5,578	4,808
Laborers	901	638	2,003	2,056	3,869	4,539

Source: US Census 1960, Table 105; 1970, Tables 141 & 142; 1980, Table 120.

Table 17

MEDIAN EARNINGS BY INDUSTRY AND SEX
Puerto Rico: 1960, 1970, and 1980
(US dollars)

	1960	1970	1980
All Males	$1,105	$2,827	$5,744
Manufacturing	1,501	3,068	6,466
Chemicals	1,988	3,991	8,673
Drugs	n.a	n.a.	8,603
All Females	$1,125	$2,567	$5,505
Manufacturing	1,061	2,310	5,108
Chemicals	2,028	3,198	6,956
Drugs	n.a.	n.a.	6,919

Source: US Census 1960, Table 111 ; 1970, Table 143; 1980, Table 129 and 5% sample.

But these are broad judgments based on estimates obtained with the use of broad classifications which do not reflect the particular characteristics of the numerous jobs each category embraces nor the particular working circumstances of men and women as determined by demographic characteristics, cultural conditions, and working preferences. Such comparisons omit, above all:

i- The differences among the individual components of each occupation. The heterogeneous nature of the components can be surmised even from Appendix I which gives only a summary of each occupation's contents. The more detailed and specific the occupational level at which earnings differences between men and women are measured and compared, the correcter will be the interpretation of the factors that cause the discrepancy.

ii- The age differentials among the genders in different industries and occupations. It can be contended with reasonable safety that, ceteris paribus, the younger the individual, the less the experience, hence the lower the earnings.

iii- The number of years each individual has been attached to the labor force. Once again the sequence would run from long years to high pay, cet. par.

iv- The number of hours per week and the number of weeks per year worked by the individual. The differential between part time, full time, and overtime work will affect significantly the pay levels, whatever the sex of the individual. This is specifically valid for production workers on hourly schedules, but also valid for salaried

personnel. For example, in the drug industry in 1980, 65% of women precision and craft workers are estimated to have worked full time [1/] as opposed to 78% of men; in the sales occupations 50% of women are recorded as having worked full time as opposed to 77% of men; while 66% of male operatives are estimated to have worked full time as opposed to 73% of women.[2/] This work pattern is certainly not the definitive clue to the earnings differentials, but one of many of significance in their explanation.

v- The occupational structure change, the base from which it starts, and the time span of the change. As discussed in Section IV.3.b above, in the chemical industry women have increased their presence in all occupations since 1970 (see Table 9). Their number increased dramatically in all occupations. But, except for the clerical and administrative support occupations and operatives, their employment proportion was about 20% or much less in the others. For example, although women managers and executives were almost ten times as many in 1980 than in 1970, their proportion in this occupation category rose to only 17%. It would not be unreasonable to assume that the overwhelming majority of the new entrants into any occupation would be young individuals at the beginning of their careers and with salaries commensurate with their limited experience in their area. In contrast, as a result of past employment practices men will have been in their occupation for a longer number of years with longer years of experience and commensurate pay. This may be one factor, among many, that underlies the continued differential

1/ 50 or more weeks per year, 35 or more hours per week.
2/ U.S. Census 1980, 5% sample.

between the median earnings of men and women in the same occupation.

vi- The acquired skill characteristics as judged, for example, by the level of schooling, as discussed in the previous section. Table 11 shows the lower proportion of college educated women than men in the various occupations in the drug industry. This may explain partly the differences in the median earnings between the two genders.

The present paper does not attempt to make a detailed estimate of the pay differences between men and women in the pharmaceutical industry To have "a significant relevance, the exercise would require a more in-depth analysis than Census data permit. Detailed information will have to be gathered via a scientifically designed questionnaire from a significant sample of drug companies on the Island, requesting data on employment and earnings by sex and by individual job positions combined with the labor supply and demographic characteristics of the individuals holding the positions. The collected data could then be used not only to establish the differentials, if any, in a reliable way, but would also lead to testing of hypotheses re the explanatory factors and their significance.

Appendix II merely discusses three methodologies to evaluate equal pay for equal work. The first is useful in having a first assessment of the magnitudes involved. The third refers to occupational segregation and has been used widely. The second lends itself precisely to the type of analysis suggested in the previous paragraph.

V. ECONOMIC PARITY

Section IV provided a profile of female employment as it changed over the years and gave special emphasis to its characteristics in the chemical and drug industry. No doubt, market forces, economic growth, and the demand for differential skills and occupations dictated by industry-specific requirements, combined with the response and adaptability of labor to changes in demand, have shaped, to a large extent, the pattern and extent of women's involvement in industrial production.

But these are only part of the explanation. Forces other than those strictly and directly relating to the labor market have also influenced work attitudes and employment practices. These in turn were instrumental in altering the occupational pattern of women. Among these are legislative actions which reflect and help crystallize new social attitudes which alter the way women's functions come to be regarded.

The present section first looks at the legislative and public action in effect today in Puerto Rico. Subsequently it assesses the legal requirements in training. Finally it summarizes the practice in the drug industry based on interviews with the personnel of selected companies on the Island.

1. Legislative and Public Action

In Puerto Rico legislative action to "protect" the interests of the working women go back almost 70 years to Law No. 73 of June 1919 which regulated the hours when either sex could work in a

business establishment, but specifically barred the employment of women in night shifts. The law has been repealed in 1975. In fact, the seventies have evidenced the passage of a series of legislation which made it illegal for businesses, federal, state, or local governments, educational institutions, employment agencies, etc. to discriminate by sex, religion, race, or national origin in hiring, employing, training, educating, and assisting individuals.[1/] The development is in line with the U.S. Civil Rights Act of 1964 and its amendments beginning in the early seventies. The principle of equal pay for equal work, effort, and responsibility regardless of sex, creed, race or national origin has in general been established and is being adhered to. Politically, ideologically, and legally there are no obstacles to the employment of women in any occupation provided their capacity and ability are found to correspond to the requirements of the job.

Today the U.S. Civil Rights Act of 1964 applies equally in Puerto Rico as it does in continental United States. Its Title VII "Equal Employment Opportunity" (EEO) prohibits discrimination because of race, color, religion, sex, or national origin in hiring and upgrading employees and in any other conditions of employment. It

1/ In 1973 the Commission for the Improvement of Women's Rights was created whose purpose is to investigate cases and initiate, if needed, legal action against violators. A series of other legislation was enacted in the same year which barred discrimination from employment training and assistance programs and from work incentives programs. In 1975 the non discrimination provision was extended to fringe benefits and workmen's compensation and the mandatory maternity leave was enacted. For a summary of the pertinent legislation see W. Colon-Rosa "Diferencias en Remuneracion en el Sector Laboral entre el Hombre y la Mujer: el Caso de Puerto Rico, "Master's Thesis submitted to the Department of Economics, Univ. of Puerto Rico, August 1979.

specifies that jobs cannot be restricted to members of one sex, just because co-workers, employers, clients or customers prefer it so, or that traditionally the job has been performed by one sex, or that the job involves heavy physical labor, manual dexterity, late night hours, overtime, work in isolated locations, travel, travel with members of the opposite sex, unless there are bona fide occupational qualifications.[1/]

The EEO Act of 1972 amended Title VII and strengthened and expanded its coverage by making it applicable to private employers of 15 or more employees [2/] and to state and local governments and educational institutions. Title IX of the Education Amendments now applies the provisions to educational programs or activities receiving federal financial assistance. It not only prohibits discrimination by educational institutions but addresses the education - employment connection directly by mandating the institutions to withdraw assistance from recruiting parties that discriminate in employment. In addition an Executive Order (No. 11246) - the federal compliance program - addresses specifically current and potential holders of federal contracts and contains the power to withhold sizeable federal contracts from discriminating enterprises institutions, or agencies.

[1/] For example: modelling for women's or men's clothing.

[2/] Also to unions with 15 or more members and employment agencies dealing with employers with 15 or more employees.

The consequence of it all is that today industrial operations, educational institutions, and state and local governments in Puerto Rico are all equal opportunity employers. This is not to say that discrimination does not exist in the society, for as long as vestiges prevail which bias the control over and access to resources and property rights, to that extent parity will be absent.

In Puerto Rico, as part of the United States, forces are at work that gradually are removing the tainted vestiges. In other societies these forces may not be as powerful or effective. This is the inference that can be drawn from U.N.'s own appraisal in 1984 of the achievements of the Decade of Women, which states the following factors as the stumbling block for the achievement of economic and social parity between men and women:

> "...the lack of consciousness and understanding on the part of policy makers and apathy at the policy making level....lack of recognition of women as particularly disadvantaged and requiring specific attention; insufficient awareness of the contribution that women made to economic and social development; lack of recognition that women's issues were an inextricable part of the global issues facing humanity; and lack of recognition of the justness of equality for women. 1/

Certainly these were not the characteristics of the Puerto Rico of 1984 and are less so of today, despite the past legislation which with good intentions encouraged discrimination against women and

1/ U.N. World Conference to Review and Appraise the Achievements of the United Nations Decade for Women. Equality, Development and Peace. Report to the Secretary General, Part One: General Trends in Equality, Development, and Peace A/Conf. 116/5/Add 5 Dec. 1984, p. 22

barred them from full participation in higher responsibility and higher paying jobs. There is a significant change in the ideological legal, and institutional climate. There is a pro-egalitarian, ideological trend, a political commitment to equality and a slow but definite taking of root of a socialization process which tears down traditional attitudes about gender-related economic roles, occupations, work preferences, expectations, aspirations, and perceptions.

2. Legal Requirements in Training

The previous section on legislative and public policy action makes it clear that today in Puerto Rico there are no special legal requirements to train specifically the female labor force. All employees are treated equally within the law regardless of sex. This was not necessarily the experience in the past when the Dept. of Labor itself, in its assistance to recruit workers for companies establishing operations on the island, had categorized jobs suitable for men (heavy lifting, product mixing, industrial equipment repair etc....) and suitable for women (manual dexterity requiring operations, assembling, repetitive machine operating, secretarial etc....) and sent candidates for the openings following this line of perception and identification. Over the years women have made inroads into changing this perception and crossed over to occupations previously confined largely to men, as has been demonstrated earlier on. The EEO legislation has been a crucial factor in changing the official attitude and practice.

Under the circumstances it is of significance to mention briefly the procedures and facilities for recruiting and training personnel. A more detailed summary is given in Appendix III which also lists the legislated mandatory fringe benefits accessible to all employees in industry, except for maternity leave which applies only to female employees. The concept of parental leave, as implemented in some European countries, which allows leave for both parents in the care of the newly born child and is claimed to raise the stability of the female labor force and increase the entry of women into non-traditional jobs with better career prospects, has not as yet taken root in either the legal climate or the business practices in Puerto Rico.

Personnel into the industry is recruited through a computerized job bank, employment agencies, newspaper advertising, word of mouth, and postings in the different divisions of the companies themselves. The P.R. Employment Service, which is an affiliate of the U.S. Employment Service, maintains an active file of readily available applicants and performs testing and other screening services to assure qualified workers for any job level. These services, together with the Dept. of Industrial Services of P.R. Economic Development Administration help bring employer and employee together. Puerto Rico counts with a system of Executive Search and recruitment firms which operate under the EEO provisions and help locate local technical, administrative, engineering, and managerial personnel. Many times contact between the employer and employee succeeds through advertisements in the daily papers and through announcements in the periodic publications of professional organizations.

There are training programs at the public and private level as well as within the companies in accordance with their needs. Training is geared to all job classifications and to all levels of occupations from management and supervisory development to any type of industrial training. It is done through the Economic Development Administration itself, through the Dept. of Labor, through a great variety of vocational schools, and through technological institutes under the auspices of the Dept. of Education.

The Employment Service is responsible for programs that give workers on-the-job training at wage rates less than the minimum wage. The Right to Work Administration within the Dept. of Labor provides on-the-job training to groups of workers whereby the hourly labor cost to the companies is reduced by up to 50% during the period of training. The Economic Development Administration sponsors programs whereby supervisors and production line workers are trained in a concerted effort with the Dept. of Labor, the Dept. of Education, the Right to Work Administration, and the Univ. of Puerto Rico. Also in conjunction with the latter, programs are implemented with curricula designed to correspond to industry specific needs as conveyed by the industries themselves with added theoretic and academic training in the areas concerned and some assurance of employment, whenever possible, by the industry itself. These programs are open to all without discrimination of sex.

3. Industry Practices in Recruitment, Training and Promotion

To have a broad idea of the recruitment , employment, training and promotion practices by pharmaceutical companies, informal discussions were held with managers and professionals of both sexes in the areas of plant operation, production, employee relations, personnel, equal employment opportunity compliance, public relations, and training in companies whose combined employment represented about 25% of the total employment of the pharmaceutical industry. The focal points of the discussions are listed in Appendix IV. The informal nature of the conversations is to be emphasized. No formal questionnaire was submitted to the companies. The findings are summarized below:

a: In the employment of women the companies' profile corresponds more or less to that emerging from the Census data: about 30% of the employment in the managerial and professional occupations is female, with the greater proportion in the professional category than in management. Women also prevail at the clerical level and as operatives.

b: Top level manufacturing management is almost strictly male, though women have made inroads, albeit very limited, to this level of management. Most female managerial categories are finance, quality assurance and control, accounting, forecast and treasury. A materials manager or a manufacturing manager is a rarity.

c: The companies are in essence gender blind. Given the employment qualifications of a post, that applicant is selected whose capacity or ability satisfies the requirements of the task. The main objective is to get the right person to the rig ' job whether promoted internally or recruited from the outside. If potential problems exist, it is recognized that these relate to the personality and not to the sex of the applicant. Usually a potential problem analysis is made to determine the choice of the candidate.

d: The employment of women is welcome at all levels, for experience shows that:

i - Women make excellent workers and assimilate much better into the work force; they work very well in teams.

ii - Women make better trainers as well as trainees.

iii - Women do not raise the absenteeism rate or have a higher turnover rate than men. Absenteeism for all workers is reduced by company practices that provide preventive health care on plant premises or through work hour arrangements that allow visits to doctors.

iv - Marriage does not create severe problems in the employment of women. The companies grant the legal maternity leave to the flexibility allowed by law. And women employees return, without fail, to their jobs after their maternity leave expires. It is recognized that women experience productivity reduction during their pregnancy, and this is accepted as part of the working life. Pregnancy does not deter companies from recruiting or promoting female workers.

v - Women do not necessarily suffer more from stress than men because of the dual role they play at work and at home. This is corroborated by the fact that as many men seek stress counselling as women; the reasons are mostly unrelated to jobs and may lie in personal and family conditions. In fact, women are less inhibited in seeking the help of counsellors. They heed opinions better than men, which leads to increases in their productivity.

vi - In higher responsibility echelons women appear to succeed better than men, for they are determined and resolved to assert themselves in a group of males.

e: Working hours, especially the night shift, create apathy with respect to some women workers. Some shun the night shift despite the pay incentive it involves; whenever the opportunity arises they opt for training and move to other jobs within the company even if it implies pay loss, sometimes in the magnitude of $1.00 an hour. Other women, however, find the night shift preferable, because it allows them to spend the day with their family and children. Companies have been able to work around this problem by restructuring jobs in ways that make them acceptable to women workers. In other words, they were successful in changing their practices to be able to accommodate the employment of women in larger numbers. The change has brought indirect benefits by reducing the incidence of accidents or even avoiding accidents totally.

f: Women also have apathy for certain types of jobs. Some are reluctant to collaborate in teams or jobs where men are concentrated. They consider such positions as male positions unsuitable for women. Also, they simply do not apply for jobs which they consider are unsuitable for women. It is their perception, not company policy, that prevents their entry into these jobs. In some cases companies have been successful in circumventing such cases, again by redesigning jobs.

g: Social perceptions play a significant role in some cases as determining the jobs that a woman should do. These are more to be found in what is known as the trades, such a mechanical and electrical repairs and maintenance. Female applicants simply do not come forth for some posted openings. So far there has not been a concerted effort by managers to go out and seek potential female candidates and exert them to apply to posts through routine channels on equal footing with men and compete with them and be selected (or not) according to their capacities and experience. At best, the efforts have been sporadic. There is a lack of assertive training, along with other training programs, to make women conscious, aware, and confident of their capabilities.

h: The companies are forward looking in hiring and promotion. There are numerous examples of women employed initially at the secretarial and receptionist levels who subsequently have attained higher positions as biologists, pharmacists, quality control managers, technical supervisors, and personnel managers through company financed studies towards the degrees the positions require, or

through constant training and upward push from with the ranks.

j: The on-the-job training program of the Right to Work Administration provides benefits to the companies in subsidizing wages at 50% rate for all employees, regardlesss of sex, who are on the program. The program is limited to six months and its benefits are not repeated unless a new product line or process is introduced. In addition, the companies too have their own programs to train their employees at every level regardless of sex.

i - There are cross training opportunities for job enrichment, i.e. workers from one section are trained for another. This in many instances leads to promotion.

ii - There are training programs in good manufacturing practices and stress management.

iii - There are educational cost reimbursement programs, the reimbursement varying from 85% to 100%. These allow employees to take time off and study with the objective of improving their skills, including the study of English. Not only professional employees, but also production workers are eligible under the programs. At the one extreme is the system which allows for flexibility of making arrangements with their fellow employees to take over the work responsibility of the hours they take off; at the other is guaranteeing the position of the employee for one year until the employee returns, with the possibility of promotion should the circumstances permit. Some companies finance the cost of their employees' night studies. All provide summer internships in

disciplines relevant to their line of production, such as pharmacy, biology, chemistry, etc., to benefit college students. These work in the plants with pay corresponding to the positions they fulfill; they familiarize themselves with plant operations, the business atmosphere and learn from the experience, regardless of whether they end up being employed by the companies.

iv - Companies provide training seminars for their employees in the United States, or they bring down experts to train the personnel.

k: Individual personality is found to play a more important role than company practice in any apparently sex discrimination that might occur. The problems most of the times are rooted in personality clashes rather than male female differences.

l: All those interviewed were of the opinion that:

i - EEO legislation should continue and in fact should be implemented more strictly and effectively than it is being done currently.

ii - Despite the significant changes that have taken place in business attitudes towards equal treatment of women, there is a need to change the attitude, still prevalent, of judging women prior to their performance and expecting them to prove themselves before they are truly accepted, while the same attitude is not apparent in recruiting men.

iii - Education, skills, and technical training play key roles when starting a career as well as in promotion and mobility.

iv - There is a need for consciousness creation in the society and to open avenues of communication in any which way that will promote the employment of women, including working through public agencies that deal with labor problems and making them accept the new circumstances and change their attitude accordingly.

VI. SHORT AND LONG TERM POLICY IMPLICATIONS

The changes that have taken place in the employment of women in general in Puerto Rico, and in its chemical and drug industry in particular, have shown that:

1. Six times as many women are employed today in the pharmaceutical industry as opposed to 1970, and women represent on the average about 38% of the industry's employment.

2. The occupations in which women are employed changed drastically over the years, but the change was quite dramatic in the chemical industry where women made significant inroads into "traditionally male" occupations, in line with the industry-specific high skill requirements of pharmaceutical operations. Absolutely and relatively there were more women not only in high level white collar occupations, but also in high skill production jobs. Female managers, executives, and administrators made up one-fifth of the occupation's total, and women came to represent more than 30% of the highly education- and training-intensive professional and technical occupations. A greater proportion of women also moved into precision and craft occupations. In other words, encouraged by a series of policy measures at the society and company level,

women's labor supply responded quite vigorously to the changing industrial labor demand patterns.

3. Nevertheless, despite women's higher years of schooling in the drug industry with respect to all women in the labor force as a whole, the proportion of women with a college degree or more still falls short of the proportion of men in this particular industrial branch.

4. Women's earnings, partly reflecting the educational differential and partly other factors that affect income levels, fall some 20% behind those of men.

The vigorous labor supply response to the changing industrial demand pattern stems from many factors. These include changes in social attitudes towards greater acceptance of women's permanent attachment to the labor force; effective implementation and enforcement of EEO legislation which bars discrimination on account of sex, race, color, religion, and national origin in business, government, and educational institutions; but also from good company practices in compliance with the legislative intent as well as with the basic principles of profitability, employee and client satisfaction, and serving the community.

As interviews with company representatives have indicated, the plants are training intensive. Many employees are hired at low skills, trained through various programs, and encouraged to move into higher skill requiring positions. In other words, in-plant mobility is encouraged, although the direct recruitment of middle and high level employees from outside is not precluded, especially

if thereby new, unbiased, and innovative ideas and designs can be introduced. Companies also provide opportunities for employee advancement and career development through out-of-the-plant education funded by tuition reimbursement programs. The training and advancement schemes apply to all employees irrespective of sex. But in the process, and in compliance with EEO legislation requirements, companies have succeeded in raising the number of their female employees, introduced innovative job designs to correspond to work preferences of women, and provided women with opportunities to obtain higher level jobs than have been generally available elsewhere. For, as the interviews illustrate, they have been very satisfied with the work performance of their female employees.

However, obstacles still remain to a higher degree of absorption of women into the pharmaceutical labor force. These appear to be more in the embedded perceptions of both women and men as to the function of women in society, the type of work women can be required to perform or are suitable to do so, and the social work atmosphere in which women would like to work or should be asked to work.

Obviously then actions to redress the deficiencies in economic parity between the genders will have to consider measures that can be implemented at the work place in the short term as well as those at the societal level which will have relevance for the long term. The long term perspective must address the issue of eliminating social barriers to women's participation in the labor force, must assure their attainment of the required educational levels and human capital accumulation, and must raise their expectations by

eliminating any sex role socialization that affects the values men and women attach to different activities and pass on as such to their children and thereby perpetuating skill and personality traits. The interaction between the short and long term policy action is not to be denied.

1. The Short Term Perspective

a: Emphasize on-the-job training.

Once schooling is accomplished, further human capital is accumulated through on-the-job training. College trained workers themselves report that they acquire cognitive skills through informal on-the-job training. College students on summer internships in manufacturing plants report having acquired invaluable knowledge during their short span as trainees.

People accept on-the-job training if they expect to continue to work in the future, for it is only then that they will obtain the reward of higher wages stemming from their increased productivity resulting from training. If low preference for future labor force participation is concomitant with less investment in on-the-job training, then many women can expect to be faced with poor occupational characteristics, which may create the vicious circle of preventing women from accepting any employment. Women, therefore, should be encouraged not only to participate in the labor market, but also to increase their investment per unit of work experience. The result will be employment of women in higher pay occupations and hence a narrowing of the earnings differential between the sexes.

The pharmaceutical industry in Puerto Rico is extremely training intensive and actively engages in on-the-job training partly subsidized by the PR Government and partly funded by the companies themselves. Such programs have led to in-plant mobility and employee advancement.

b: Provide vocational and literacy training.

Surveys of training needs of industries can reveal crucial aspects of the areas in which the available qualifications of the labor force fall short of the industry-specific requirements. A recent study by P.R. Economic Development Administration based on a sample survey of the manufacturing and service sector of the Island revealed that more than half of the respondent firms needed some training for their workers. The greatest need was in the category "knowledge of production processes". It also revealed the dire need of making up for the deficiencies in English, Spanish, and mathematics. 1/

c: Address occupational segregation directly.

Some occupations are integrated, i.e. men and women participate in almost equal proportions in their employment. Others are more "male dominated" or "female dominated" as a result of long past employment practices and traditions. Policy measures should aim at eliminating the barriers to the movement of women from traditionally female occupations into atypical occupations. Among such measures are:

1/ P.R. Economic Development Administration, Necesidades de Adiestramiento de los Recursos Humanos dentro del Sector Manufacturero y las Industrias de Servicio, San Juan, July 1986.

i - EEO legislation: Barring discrimination on any grounds has had the effect of raising the proportion of female employment in occupations which had not been accessible to women. This is verified by studies based on the U.S. experience, and is inferred from women's occupational structure change in the chemical and drug industry in Puerto Rico. The EEO legislation has the positive impact of raising the demand for services of the female labor force as well as giving an impetus to its supply. Career aspirations are transformed, more women acquire higher education and specific skills that prepare them for non-traditional occupations, hence more women become ready to take responsibility in traditionally male occupations.

ii - Training in technology: Higher skills in complex technologies required by the industries will make high pay blue collar jobs more accessible to women.

iii - Incentive legislation: Subsidize employers to train their workforce. The Puerto Rican experience is an evidence of the success of such legislation.

iv - Institute measures to maintain the female labor force: Many times barriers to women's entry into certain jobs, such as those requiring high levels of physical strength, can be removed by a simple restructure and redesign of the job to correspond to the capabilities of women, as has been shown by company practice in Puerto Rico. At other times, family and working life can be reconciled by the institution of fringe benefits that encourage women to enter and remain in the labor force, such as paid leaves

for childbirth and infant care, provision of improved facilities for the care of children and other dependents, or by organizing working time and working conditions in ways that allow households the choice of dividing their time between the home and the market place.

v- Training to raise the assertiveness of women; encouragement to seek positions to which women usually do not apply but in which they would succeed just as well as men.

vi- Provide labor market information useful to women. Pay special attention to orientation, counselling tutoring, job development, placement, and follow-up. Though not an officially instituted policy, the drug industry executives in Puerto Rico in fact pursue such policies in the interest of any employee, regardless of sex.

2. The Long Term Perspective

a: Accent human capital formation.

The crucial significance of skill acquisition, training and education is all too clear by now. Men and women may not be alike in these respects. Hence the objective should be to make up for the deficiency and devise measures that enable women to acquire the required training for the performance of the job.

Human capital accumulation provides jobs as well as relative stability, for whether in a recovery or in a recession, the first jobs to be lost are the unskilled ones. When during the recovery of 1977-1980 the Puerto Rican economy gained 80,000 jobs, 13,000 jobs were also lost. Close to 90% of the job gain went to individuals with 12 years or more of schooling, two-thirds of whom were

college educated. In contrast, all the job losses corresponded to individuals with less than 9 years of education. In the recession of 1981 - 1984 job losses were widespread, but those with high school or more years of education gained 44,000 jobs, while 54,000 with 4-11 years of schooling lost their jobs.

Moreover, manufacturing has become technology intensive and is progressing even towards higher intensity. Overall, it is the industries characterized by high technology intensity that are raising their employment. The pharmaceutical industry counts among the top 10 of such industry groups.

Thirdly, although human capital formation does not explain the relation totally, there is a close correlation between increased human capital formation and high remuneration in occupations. Despite the vestiges of sex discrimination that still remain, women have been making inroads into such occupations, especially in the pharmaceutical industry, since they were better equipped to compete more favorably in the labor market.

b: Improve the education system overall

On-the-job training plays a vital role in raising employee skills in an environment of increasingly technological modern industry. But the effectiveness of on-the-job training is likely to remain limited unless there is a solid fundamental educational background which ensures the workers' trainability. If those that are being trained are not sufficiently trainable, they will not become employable and programs will not yield results.

Over the long run improved general education can contribute substantially towards forming the basis of a more technologically advanced labor force.

c: Build up data base.

Even in Puerto Rico with relatively sophisticated information systems, data are inadequate and costly to obtain and generate. The situation is more serious in very many LDC's although many Latin American countries, for example, have wide economic data base. Assessment of women's involvement in the development process and particularly in their employment and upward mobility in industry requires supplementary and detailed micro data base. No rational decision can be taken unless it is based on information that permits assessment and comparison of changes and differentials. Serious efforts should be made by the national statistical services to compile labor force and employment data by sex, occupation, earnings, industries, demographic characteristics, hours and weeks worked, etc. and to carry out surveys of individual industries where women's participation is considered to be of special significance in their economic progress in particular and of the society in general.

d: Introduce legal reforms regarding civil rights.

Legislation that discriminates against the employment of women should be removed. Agreement on this statement may be near 100%; disagreement is mainly on its acceptability by the society and hence implementability and enforceability. In many LDCs the contstraints are much too strongly embeddded into the social texture and painstaking and slow to remove, if not enforceable.

Countries differ in their socio-political texture. Differences exist because of religious beliefs and their implications for the role of the sexes in society. Differences also exist because of historical developments which need not occur in the same direction and with the same intensity in all societies. Values differ because of sociological and geographic factors and a myriad of others.

Each society will have to take these constraints into account and endeavor, to the maximium extent possible, to alter the values which put obstacles to and enact and implement the measures that foster the equal development and prosperity of every individual regardless of sex, color, and creed. No society will achieve this egalitarian aim at the same time, since the constraints will be more restrictive in some and more lenient in others.

Two points need to be emphasized in conclusion. One is that the policy recommendations advanced above depart from the premise that in essence obstacles embedded in the socialization process are assumed away or will somehow or other have been removed. Otherwise they will lose in effectiveness. The second is that they are in essence derived from the experience of Puerto Rico which is an economy on its way to development from a strictly economic point of view, but shares a lot of characteristics in common with developed countries in its social and political outlook. It should not be forgotten that federal legal statutes relating to women's equality in the labor market apply in full strength on the Island.

In this sense Puerto Rico stands far apart from many another developing country. In contrast to the conclusions reached in the U.N. study on Women's Participation in Development (New York, 1985):

- Willingness to set women's issues as a political priority has already been accepted in Puerto Rico where woman's role in society is not neglected, a vast majority of women are well educated and trained with increased participation rates and higher remuneration position.

- Most women are not in the least skilled and lowest paid jobs in Puerto Rico with little possibility of promotion and no security. Their working conditions are sanitary and they enjoy a variety of support services including maternity leave and a gamut of fringe benefits which are effectively enforced.

- They are not hampered from gaining promotion. In fact efforts are being made both at the company and the society level to ensure that they indeed advance within the ranks to positions of higher skill, higher fulfillment and better remuneration.

Despite the differences between Puerto Rico and many other LDCs, lessons can be learned from its experience which hopefully will assist women towards speedier economic progress and higher level of economic welfare on equal footing with men. The single most significant point that emanates from the analysis is the recognition that every individual, male or female, should have the liberty and the avenues to occupy the position he or she is

desirous of and to which he or she is amply qualified. They should also have the freedom to acquire the skills which will enable them to move from whatever occupation they hold into those to which their newly acquired skills correspond. The assurance of a system which will enable them to do so is the most crucial factor in the development of human resources of whatever sex, creed, color, or race.

Appendix I

OCCUPATIONAL CLASSIFICATION

The U.S. Census Bureau has, over the years, changed its method of assigning individuals to occupations. The change has resulted in several dramatic occupational shifts, particularly from and to managers and administrators and from other groups. Thus the occupational categories are not strictly comparable over the years. Below, however, is a summary of the approximate occupation content of the global categories which have been used throughout the present study.

Executive, Administrative, Managerial

Public administrators; financial managers; administrators; salaried or self-employed managers and administrators in all industries; management related occupations (accountants and auditors; personnel, training and labor relations specialists; buyers and purchasing agents; inspectors and compliance officers).

Professional and Technical

Engineers, architects, and supervisors; computer analysts, scientists programmers; operations researchers; all types of scientists, physicians, dentists, pharmacists, health technologists; teachers, lawyers, writers, musicians; all types of tecnhnicians - health, science, electronic, industrial, etc.

Sales

Supervisors; finance and business services; sales representatives; retail and personal services; cashiers.

Clerical

Administrative supervisors; computer equipment operators; secretaries; receptionists; clerks; record processors; traffic and shipping clerks.

Services

Private household workers: protective services; health, food, cleaning services.

Precision and Crafts

Industrial machinery maintenance; electronic, car mechanics air conditioning repairers; construction crafts of all sorts; precision production occupations in industry.

Operatives

Machine operators, assemblers and inspectors; welders; testers; graders, sorters; fabricators; moving equipment operators.

Laborers

Handlers; equipment cleaners; helpers; construction and other laborers.

Farming

Farmers and farm managers; farm laborers and foremen; unpaid family workers.

Appendix II

METHODOLOGIES TO EVALUATE EQUAL PAY FOR EQUAL WORK

The methodology to assess pay differences between the female and male labor force can vary from the most complex to the most simple, depending upon the availability of the information each one requires or the cost of generating the data required which is not readily accessible.

In this appendix three methodologies are specified and discussed to assess the earnings differential between the male and female labor force. The first two take pay as the dependent variable to be explained by differential characteristics of the two sex components of the labor force. It is only after taking such characteristics into account that the remaining differential can be reasonably assumed to stem from discrimination. Accordingly measures can be designed that, ceteris paribus, narrow the differences in the job market characteristics of the sexes as well as to address the various facets of the sex residual that remains once such differences are eliminated.

The first methodology can be executed somewhat more simply without resort to econometric methods; the second is more complex and relies on statistical correlation analysis. The third uses an index of occupational segregation which is a summary measure the decline in the magnitude of which would indicate, by inference, the narrowing of the pay gap between the two sexes, on the

assumption that a movement by women into traditionally male occupations will result in real economic gains for them.[1/] Needless to say , all require a range of data which are not necessarily or readily available in many less developed countries.

1. An Index of Pay Differences between the Sexes.[2/]

This index, one of the first to be developed, starts with measuring the simple difference between the mean earnings of the male and female employed and then adjusts it for the differential employment characteristics of the sexes to be able to remove that part of the difference that is not directly attributable to sex, and to gauge that part which may be done so, and which, in turn, may influence women's job market characteristics. The differential employment characteristics that immediately come to mind are: occupation, hours worked, age, schooling, and area of residence, since scales and remuneration even within the same gender can vary according to the skills acquired, toplace ofwork, to the skill requirements of the occupation, or to the intensity with which the worker dedicates time to work, and from region to region.

1/ Provided that, when women move out of the occupations where they are concentrated into more male-intensive jobs, their pay reflects an unbiased assessment of the true worth of these jobs.

2/ See especially H. Sanborn, "Pay Differences between Men and Women," Industrial and Labor Relations Review, July 1964, pp.534-550.

The first step is to calculate the ratio of the earnings of the entire female labor force to the earnings of the entire male labor force:

$$E_f/E_m$$

where E_f and E_m are earnings of females and males, respectively. The lower the ratio from (1), the higher the differential between the male and female earnings.

The second step is to adjust this aggregate ratio by the occupation characteristics of the sexes. This can be done by means of two weights, one based on the number and earnings of men in a particular occupation, and the other on the number and earnings of women in the same occupation. In other words:

$$M_{wts} = \frac{\Sigma Q_{im} \cdot E_{if}}{\Sigma Q_{im} \cdot E_{im}} \quad \text{and} \quad F_{wts} = \frac{\Sigma Q_{if} \cdot E_{if}}{\Sigma Q_{if} \cdot E_{im}}$$

where Q_{im}, Q_{if} = number of men and women, respectively, in occupation (i)

and Y_{im}, Y_{if} = earnings of men and women, respectively, in occupation (i)

The exercise will yield two indices; the difference between the values of the two and that of the unadjusted index is then expected to explain the earnings differential due to the occupational structure of male and female employment.

The third step is to make an adjustment for hours worked by occupation and sex, since men and women do not necessarily work the same amount of hours during the year, with women in general working lesser hours than men. The adjustment factor would then be:

$$H_{im}/H_{if}$$

where H_{im} and H_{if} are hours worked by men and women, respectively in occupation (i)

Earnings of women in each occupation will then need to be adjusted for the hours worked factor before the "M_{wts}" and "F_{wts}" are calculated. The difference between the values of the new two indices is then expected to reflect the sum of the occupational cum hours worked differential between men and women.

The fourth step is similar to the above procedures but now adjusts for differences in levels of schooling. To do this, one needs to know:

a: the distribution of men and women by level of schooling completed in each occupation; and

b: the earnings by level of schooling completed.

The two combined will yield the earnings of men and women in each occupation by level of schocling completed. The ratio between the two will yield the education adjustment factor, which,when applied to the incomes of men and women in each occupation already adjusted for hours worked, will yield tv new "M_{wts}" and "F_{wts}" by occupation. The difference between their value and that of the unadjusted index is then expected to explain the impact of the occupation, hours worked, and education factors in remuneration differences between men and women.

Finally, the age adjustment can be made by calculating

the proportion between the median age of men and women in each occupation and applying it to the hour adjusted earnings. Thereby new "M_{wts}" and "F_{wts}" will be obtained.

The number of adjustments can be increased to take account of additional factors.

The methodology may be tedious, but given the availability of data on employment and earnings of women and men by occupation, level of schooling, and hours worked, the indices can be computed with relative simplicity and yield a better measure of remuneration differences between the genders than a simple average which fails to account for factors other than sex. To give an example, computations based on the 1970 Census data have shown that using "F_{wts}" a 40% simple earnings differential between employed men and women in Puerto Rico is reduced to 15% with an occupational adjustment and to 8% with an age adjustment.[1/]

2. An Econometric Approach to Evaluate Equal Pay for Equal Work.

An econometric approach to explain the difference between the remuneration of men and women in equal work has the advantage of accounting simultaneously for the different factors that play a significant role in determining this difference.

1/ See W. Colon-Rosa, "Diferencias en Remuneración en el Sector Laboral entre el Hombre y la Mujer: el Caso de Puerto Rico," Master's Thesis submitted to the Department of Economics, Univ. of Puerto Rico, August 1979.

Foremost among such factors is the degree of human capital formation. This is a coherent, logical, and internally consistent model which tries to explain the male-female earnings gap through the differences in the amount of human capital they embody, i.e. it emphasizes the importance of schooling, experience, and training and acquired skills in determining the job assignments of men and women.

Numerous studies have established that indeed part of the male-female earnings gap is explained by differences in the amount of human capital accumulated by workers.[1/] But only part. For the theory does not seem to explain adequately the role of the labor supply characteristics other than human capital formation, such as marital status, number of children, hours and weeks worked. Nor does it take into account institutional factors, such as the size of the employer firm, the industry of the firm, the degree of effectiveness of equal opportunity legislation, if any; or factors that include work responsibility, employee supervision, monetary resource control, and many more others, including even cultural ones.

1/ The literature on the subject is abundant and empirical work numerous. For the seminal work in human capital theory see Gary S. Becker, Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education, New York: Columbia Univ. Press, 1964. For a review of studies which approach the earnings gap from the human capital theory point of view see D.J.Treiman and H.I. Hartmann, Women, Work and Wages: Equal Pay for Jobs of Equal Value. Wash.: National Academy Press, 1981, pp.19-41. For selected individual applications see Jacob Mincer and Solomon Polachek, "Family Investments in Human Capital: Earnings of Women," Journal of Political Economy, 82:2, 1974; J.Mincer and H. Ofek, "Interrupted Work Careers:Depreciation and Restoration of Human Capital,"Jour.Hum.Resources Winter 1983, pp.3-24; and C.L.Jusenius "The Influence of Work Experience, Skill Requirement and Occupational Segregation on Women's Earnings," Jour. of Econ. & Business, Winter 1977, pp.107-115.

The greater the number of variables that are chosen to explain the male-female gap, the more complex and costly the analysis will become, not only in the computation procedure, but more importantly in compiling and generating the required data.

The basic procedure, however, can be summed as follows:

$$E_t^S = a_{1t}^S + a_{2t}^S HK + a_{3t}^S LS + a_{4t}^S IN + a_{5t}^S OR + u_t^S$$

where S = sex
HK = a vector of human capital variables consisting of:
education (years of schooling)
work experience (age less years of schooling less 6)
et al.
LS = a vector of labor supply characteristics consisting of:
weeks worked
hours worked
marital status (married = 1; single = 0)
number of children
et al.
IN = a vector of institutional factors consisting of:
industry of the firm
number of employees of the firm
degree of effectiveness of non-discrimination legislation
et al.
OR = a vector of organizational factors consisting of:
years of experience with current firm
control over monetary resources
number of people supervised
et al.
u = a normally distributed disturbance term with expected value equal to zero
a_{1t} = the intercept
a_{2t}, a_{3t}, a_{4t}, a_{5t} = vectors of parameters of HK, LS, IN, and OR respectively
t = specific year

The equation, in full or abbreviated form according to the availability of data, is to be estimated for E^M and E^F. $E_t^M - E_t^F$ will then estimate the sex differential in earnings in a specific year. E^M and E^F can also be estimated for (t-1), in which case

$$(E^{M}_{t-1}-E^{F}_{t-1}) - (E^{M}_{t}-E^{F}_{t})$$

will indicate the change over time in the earnings differential between men and women.

The estimations can be computed for the economy as a whole aggregated over occupations and economic sectors, for a given occupation, or for a given industry, according to the interest of the researcher. The methodology has the advantage of identifying the strength of several factors which are not directly sex related in explaining the earnings gap between men and women, and hence is useful in the design of effective measures to redress the imbalance.

The coefficients explain the significance of different variables in causing the earnings gap between the genders.[1/] To calculate how much of the earnings gap is caused by the difference in the mean values of variables for men and women, as opposed to differences in reward structures, the mean values of women need to be weighted by the male coefficients. The difference between the weighted and unweighted value will represent that part of the earnings gap which is caused by the variables not taken into consideration.

1/ A recent analysis from the United States using most of the factors cited above finds that years with current employer, weeks worked, hours worked, large size of the firm, number of people supervised have a stronger positive impact on female than on male earnings, while years of education, industry in which employed, and marital status work stronger for men. See Marianne A. Ferber, Carole A. Green, and Joe 1. Spaeth, "Work Power and Earnings of Women and Men," American Economic Review, Papers and Proceedings, 76:2, May 1986, pp.53-56.

3. An Index of Occupational Segregation[1/]

The most frequently used index of occupation segregation is the one developed by Duncan and Duncan:[2/]

$$S_t = 1/2 \sum_i |m_{it} - f_{it}|$$

where

m_{it} = the percentage of the male labor force employed in occupation (i) in year (t)

f_{it} = the percentage of the female labor force employed in occupation (i) in year (t).

Complete segregation would equate the index to 100 and complete integration to zero. The value of the index varies with the relative size and sex composition of the occupations. Hence, changes in the occupational structure of an economy as development takes place as well as in the entry mix of men and women into occupations will affect its value. The influence of each can be distinguished by using a standardization procedure. To observe the effects of changes in the sex composition of various occupations we would then need to standardize for the size of

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1/ This section draws on several works by Andrea H. Beller. See especially "Occupational Segregation by Sex: Determinants and Changes," Journal of Human Resources, 17:3, 1982, pp.370-392 and "Changes in the Sex Composition of U.S. Occupations 1960-1981," Journal of Human Resources, 20:2, 1985, pp. 235-250. It is also to be noted that the extensive work done by OECD on women's integration into the economy is based exclusively on the use of such an index. See OECD, Women and Employment Policies for Equal Opportunities. Paris, 1980, and OECD, The Integration of Women into the Economy. Paris, 1985.

2/ Otis D. Duncan and Beverly Duncan, "A Methodological Analysis of Segregation Indexes," American Sociological Review, Vol.20, April 1955, pp.210-217.

of occupations.[1/] This would require holding constant over time and could be done as follows:

$$m^{+}_{it} = \frac{(M_{it}/T_{it})(T_{it-1})\ 100}{\sum_{i}(M_{it}/T_{it})(T_{it-1})}$$

$$f^{+}_{it} = \frac{(F_{it}/T_{it})(T_{it-1})\ 100}{\sum_{i}(F_{it}/T_{it})(T_{it-1})}$$

where

m^{+}_{it} and f^{+}_{it} = standardized percentages in year (t)

M_{it} and F_{it} = number of males and females, respectively in occupation (i)

$T_{it} = M_{it} + F_{it}$ = total employment in occupation (i) in year (t)

T_{it-1} = total employment in occupation (i) in year (t-1)

To determine whether women move from traditionally female into traditionally male occupations requires an operational definition of the sex label of the occupations. This is done in terms of the deviation from the overall proportion in the civilian labor force. If men and women had identical preferences and resources and they were totally free in their choice, then they can be expected to be distributed equally among all occupations, with minor random differences. If so, the expected

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1/ Beller finds that about 80% of the decline in the value of the segregation index in the United States between 1972 and 1981 came from the decline in the sex composition within occupations.

proportion of jobs held by men (or women) in each occupation would equal their proportion in the labor force. In the literature random deviation is arbitrarily taken to be 5 percentage points.[1/] Consequently, an occupation is designated as male (or male dominated or non-traditional) if the men's share of employment in that occupation exceeds their share of the experienced civilian labor force by five or more percentage points, i.e.

$$PM_{it} \geqslant PM_t + .05$$

Similarly an occupation is designated as female if men's share of employment in that occupation falls short of their share in the experienced civilian labor force by five or more percentage points, i.e.

$$PM_{it} \leqslant PM_t - .05$$

An integrated occupation would then be one where men's share would be five or more points higher or lower than their share in the labor force, i.e.

$$PM_t - .05 \leqslant PM_{it} \leqslant PM_t + .05$$

If the relative female share increases in male denominated occupations, one can then speak of an occupational dispersion and decline in segregation. To the extent that such occupations

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1/ See Carol L. Jusenius, "The Influence of Work Experience, Skill Requirement, and Occupational Segregation on Women's Earnings," Journal of Economics and Business, Vol.29, Winter 1977, pp.107-115.

are more desirable in pecuniary terms, and to the extent that women's pay is assessed in an unbiased form in them, to that extent a narrowing in the earnings gap between the sexes can be expected.

Computation of the percentages and of the index requires that employment data be available by sex and by detailed occupation, since the more detailed the breakdown of the occupations, the higher will be the level of measured segregation.[1/]

1/ The discussion of the philosophical bases for complete integration and of its desirability remain beyond the scope of this analysis.

Appendix III

RECRUITING, TRAINING, AND MANDATORY BENEFITS IN PUERTO RICO+

PERSONNEL RECRUITING

The procedure used to recruit workers in Puerto Rico follows more or less the same patterns used on the Mainland. The main sources are affiliates of government agencies such as:

1. Puerto Rico Employment Service of the Puerto Rico Department of Labor and Human Resources. (affiliated to the U.S. Service)

2. Industrial Services Department of the Economic Development Administration

For the private sector, among other sources are:

1. Careers, Inc.
2. Dunhill Personnel Service of Puerto Rico, Inc.
3. Executive Search and Management Consultants
4. J.V. DeMoss and Associates
5. Management Search and Advisors, Inc.
6. Manpower, Inc.
7. Synectics for Management Decisions, Inc.

A. Division for the Development of Human Resources:

(Economic Development Administration, Department of Industrial Services)

Its main objective is to coordinate with other government instrumentalities in providing the services required by new manufacturing firms when getting established and aids those already established to develop into profitable operations in the shortest possible time. They work in coordination with:

1. Puerto Rico Department of Labor and Human Resources
2. Right to Work Administration
3. University of Puerto Rico

The Division for the Development of Human Resources engages in the following activities:

+ Reproduced from: P.R. Economic Development Administration, A Profile of the Labor Force of Puerto Rico, Sa. Juan, Nov. 1983.

a) Section of Management and Supervisory Development

This section designs, structures, and organizes programs in the technical, managerial and supervisory areas. Through these programs it instructs and develops personnel for the manufacturing industry.

Its main objective is to supply capable personnel for present and future demand, according to the requirements of the industrialization program.

b) Industrial Training Section

Its objective is to identify, evaluate and assist in the implementation of training programs for supervisors and production line workers, for present and future demand. It coordinates its functions with the Department of Labor and Human Resources, the Department of Public Education, the Right to Work Administration and the University of Puerto Rico's training program.

This unit provides assistance to the new entrepreneur when starting up in Puerto Rico. It advises on the planning, organization, time requirements and costs of the necessary training programs.

c) Human Resources Guidance Section

This unit specializes in advising industry on the personnel training it needs. It is now developing an action plan to coordinate and speed up the efforts of the different units within the Human Resources Development Division with other government agencies.

B. Employment Services of Puerto Rico

The recruiting system in Puerto Rico is carried out mainly through the Employment Services of the Department of Labor and Human Resources. It has a central office located in Hato Rey with ten (10) regional offices, located in the municipalities of San Juan, (Hato Rey & Rio Piedras) Bayamon, Guayama, Aguadilla, with sub-regional offices at Cayey, Coamo, Manati, Fajardo, Yauco and San German. The Employment Service operates a computerized job bank in the municipalities of San Juan and Bayamon. There are also offices located at various colleges, and at technical, and vocational schools.

The Department of Labor and Human Resources provides assistance to manufacturers and other entrepreneurs by giving information on employment, wages, and available workers in certain and specific areas. It also interviews applicants for employment opportunities through a series of pyschometric tests that measure applicants' mechanical ability skills, intelligence, and discipline.

The Employment Services is in charge of the following employment programs:

1. Manpower Policy No. 4:

   This program was started during the Korean War era and its two major objectives are:

   a) To maintain balance in the economy in the areas of high unemployment, training the available human resources and allocating them in such areas.

   b) Create jobs in industrial areas and allocate the human resources for training.

2. Comprehensive Employment Training Act 1973 (CETA):

   The "Prime Sponsors" for federal aid are located in the municipalities of San Juan, Ponce, Mayaguez, Carolina, Caguas and Bayamon. The balance of the State is administered by the Right of Employment Administration under the Department of Labor & Human Resources of the Government.

3. Learner's Program:

   Because new industries sometimes have special employment needs which cannot be met by the already trained labor force, Puerto Rico has developed a program that allows workers to receive on-the-job training at a wage rate less than the minimum wage.

4. Apprenticeship Programs:

   This program is designed to meet the needs of industries which depend on special skills or trades. If more than 2,000 hours of training are required, employees-in-training can be paid at less than the established minimum wage. Their wages are increased as their skills increase.

C. Institutional Programs

Because an educated labor force is a must for the needs of an industrialized society, Puerto Rico spends thirty-one percent of its annual budget on education.

Education is compulsory through age 16 in Puerto Rico and the average worker today has 12.4 years of schooling.

English is a required subject in Puerto Rican schools. As a result, the Puerto Rican labor force is largely bilingual.

The educational system stresses the technical and vocational disciplines.

The Institutional Programs in Puerto Rico for the manufacturing industry are coordinated by the vocational schools and the technical institutes.

1. Vocational School Courses:

There are 14 vocational schools in Puerto Rico, providing academic and accelerated training courses for workers in areas such as:

1. Ground Metal Machine
2. Assemblers & Finishers
3. Cabinet Making
4. Cigar Makers
5. Coilmakers
6. Cutters
7. Electrical Unit Assembly
8. Electrical Wiring
9. Grinders & Buffers
10. Hand Stitchers
11. Hat Makers
12. Hosiery Knitters
13. Molding Fixtures
14. Hosiery Seamers
15. Jewelry Assemblers
16. Knitgoods Inspectors
17. Knitting Machine Operators
18. Lacers
19. Loopers and Seamers
20. Machine Embroiderers
21. Mattress Makers
22. Mechanical or Metal Unit Assem
23. Mechanical Testing and Inspect
24. Metal Grinding and Polishing
25. Miscellaneous: Wood Machines
26. Molders and Finishers
27. Optical Framemakers
28. Optical Unit Assembly
29. Plastic Molding and Extrusion
30. Plastic Material Forming

Other training courses offered by vocational schools are:

1. Advanced Structural Design
2. Air Conditioning
3. Air Frame (Aviation Machines)
4. Auto Body Repair and Painting
5. Auto Mechanics
6. Bakery
7. Brick Laying
8. Carpentry and Wood Making
9. Commercial Arts
10. Cosmetology
11. Diesel Mechanics
12. Drafting
13. Dressmaking
14. Electric Wiring & Electric Motors
15. Electric Household Repairing
16. Electronics
17. Furniture Making

18. Furniture Upholstery
19. Graphic Arts
20. Ornamental Iron Works
21. Machine Shops
22. Plumbing
23. Power Sewing Machine Mechanics
24. Power Sewing Machine Operators
25. Power Plant Mechanics
26. Practical Nursing
27. Printing
28. Radio & Television
29. Refrigeration Mechanics
30. Tool & Die Making
31. Watch & Clock Repairing
32. Welding

Vocational training programs are divided into three groups:

1. Proper training for industrial operation.

2. Vocational schools providing three years of on-the-job training.

3. Where a vocational school is not established, students attend part-time classes, and part-time work is provided in a private establishment.

2. Technological Institutes of Puerto Rico

The Technological Institutes located at San Juan, Bayamon, Ponce, Manati and Guayama supplement the universities and colleges by providing training in the necessary skills for those whose vocational interests are in the technological and semi-professional levels.

These institutes are part of the Department of Public Education and provide two year programs in technological disciplines. Among the technologies taught are:

A. Electricity
B. Electronics
C. Mechanics
D. Chemistry
E. Industrial Design
F. Civil Designs
G. Data Processing
H. Refrigeration
I. Environmental Control Technologies

3. Electronic Industry Center

This center was created because of the demand for highly skilled personnel which is required by the electronic industry. It consists of two training facilities, one in Mayaguez and the other in Caguas. Courses consist of all disciplines related to the electronic sector from the technical level to the scientific level.

4. Colleges and Universities

Sixteen regional, two-year colleges award associate degrees in such industry-related disciplines as:

Communications
Accounting
Business Administration
Industrial Management
Computer Programming
Production Engineering
Electronic Technology

Six four-year colleges and universities, enrolling around 137,000 students, award degrees in the sciences, technology, engineering and business administration in addition to a full range of humanities and social sciences. Nearly 2,000 masters and advanced professional degrees are awarded each year. The six universities are:

University of Puerto Rico (Rio Piedras Campus, Mayaguez Campus, Regional Colleges)
Catholic University of Puerto Rico
Sacred Heart University
Inter-American University (San Juan Campus & San German Campus)
World University
Ana G. Mendez Foundation (Universidad del Turabo, Puerto Rico Junior College, Colegio Universitario Metropolitano)

REFERENCE GUIDE TO LABOR LAWS IN PUERTO RICO

Minimum Wages

The Fair Labor Standards Act of 1938 (As Amended)

This Act, known as the Federal Wage and Hour Law, establishes minimum wage, maximum hours, overtime pay, child labor, equal pay and record keeping for employees engaged in interstate or foreign commerce. The term "interstate commerce" is very comprehensive. In addition to those activities directly related to the manufacture of articles which will be totally or partially exported, it includes other activities which directly or indirectly require the use of interstate communication channels such as radio, television, telephone and telegraph. Employees handling or keeping records of imported goods, employees of firms supplying machinery, fuel or other materials and services to manufacturers of goods for interstate commerce, and employees doing repair or maintenance work to highways, maritime terminals and airfields come under the scope of this Law. Most manufacturing industries in Puerto Rico fall under the scope of this Law.

The 1974 amendments provide for the U.S. Secretary of Labor to continue appointing industry committees to recommend additional increases in the minimum wages. Each committee shall recommend to the Administrator of the Wage and Hour Division the highest minimum wage rate for the industry and or sub-divisions which it determines, having due regard to economic and competitive conditions, will not substantially curtail employment in the industry, and will not give such industry a competitive advantage over any industry in the United States, the Virgin Islands or American Samoa. However, no industry committee shall recommend minimum wage rates in excess of the statutory minimums applicable on the mainland.

Fair Labor Standards Amendments of 1977

Since December 31, 1980 the minimum wage has been $3.35 per hour.

Law 96 of June 26, 1956, as amended, known as the Minimum Wage Act, established the Minimum Wage Board and the system for determining wages in Puerto Rico. All employees in Puerto Rico are covered by this Act. Under this law, minimum wages are determined by minimum wages committees appointed by the President of the Board. Employers, workers, and the public interest are represented in the committee. The proposed mandatory decree is submitted to the Board recommending the minimum wage(s) and vacation and sick leave provision for employees in each industry. No amendments may be made by the Board, it can only approve or disapprove. If it is approved, the decree becomes effective 30 days after its publication in a newspaper of a general circulation. If it is rejected, wholly or in part, the Board has the option of resubmitting it to the same committee for revision, stating the reasons for rejection, or for the appointment of a new committee. Revisions are effected every two years.

Since the two sets of minimum wage regulations discussed above are applicable to Puerto Rico, it should be clear that the higher rate prevails if the manufacturer sells in both the interstate-foreign and local markets.

Mandatory Fringe Benefits and Other Regulations

Regular Working Hours, Extra Hours and Rate of Pay

Local Act No. 379 of May 15, 1948, as amended by Act No. 223 of July 23, 1974 establishes a regular "work day" and a regular "work week". Eight (8) hours of work during any period of twenty-four consecutive hours constitute the regular work day. Since the Federal Wage and Hour Law sets minimum standards, not maximum, under the local law the time worked after eight (8) hours a day is always overtime. Act No. 223 changes the duration of the "work week" in two steps. Effective July 1, 1974, the "work week" was reduced to 44 hours and effective July 1, 1975, it was reduced to 40 hours.

Overtime under the Federal Wage and Hour Law is compensated at time and a half (1-1/2) the going regular rate of pay. Under the local law overtime payment is determined at time and a half (1-1/2) or double the time, depending upon the provision of the Act which applies. Applying the same rule set above, when covered by both laws the employer is obligated to pay the highest rate. Following is how the rule works out for employers covered by the Federal Wage and Hour Law.

> Daily overtime must be paid at the rate of time and a half (1-1/2) the rate of wage agreed upon for regular hours.
>
> If the employee works more than eight (8) hours in a day, but the total number of hours worked during a given week exceeds forty (40) hours, these hours must be compensated at double the regular wage rate.

Meal Periods

The period assigned for taking food should commence not before the conclusion of the third, nor after the commencement of the sixth consecutive hours of work, so that at no time would the employees be required to work more than five consecutive hours without pausing in their duties to take food.

Dismissal Law

Commonwealth Law No. 80 of May 30, 1976, establishes a penalty upon the employer who dismisses a worker without just cause. The law is applicable to all workers other than those hired for a definite time. This law does not apply during the probationary period, which cannot extend beyond three months unless there is written authorization from the Secretary of Labor, who can extend the probationary period up to six months. The penalty in cases of dismissal without just cause is one months' salary, plus an amount equivalent to one week of salary for each year of services rendered. In those cases where the salary is on an hourly basis, the penalty will be computed by multiplying the hourly salary by 208.

Working Mothers

Commonwealth Law 3 of March 13, 1942, as amended, establishes that every employer will allow his female employees maternity leave of four weeks before birth and four weeks after, at half pay. In case the worker does not use part of the four weeks before birth she is entitled to the unused amount after birth. Also, the pre-natal leave period may extend beyond four weeks, when there is a delay in the birth date but the employer's total liability will not exceed eight weeks at half pay. In case there are complications due to pregnancy, and the worker presents a medical certificate, the employer must reserve the employee's job for up to twelve weeks in addition to the four weeks post-partum maternity leave, i.e., a total of 16 weeks. The average weekly salary of the last three months worked by the employee prior to commencing her maternity leave is used to compute the compensation to which the employee is entitled.

Effective May 4, 1982 (Act No.7) provides for the payment of wages by the employer in advance for the full eight (8) weeks maternity leave as provided by law.

Unemployment Compensation

Commonwealth Law 74 of June 21, 1959, as amended, known as the Employment Security Act, establishes the Puerto Rican employment insurance system. All employers in Puerto Rico are covered by this law. The employer has to pay a tax of 3.65 percent of the wages paid to each worker.

There is no experience rating system in Puerto Rico for Unemployment Compensation.

Disability Benefits

Commonwealth Law 139 of June 26, 1968, establishes a program of non-occupational disability benefits. This program is financed through employer contribution of .0030 of the first $9,000 in wages paid to each worker who, in turn, also contributes .0030 of his first $9,000 wages. This program is under the direction of the Department of Labor. The employer is allowed to use a private carrier to provide this benefit to his employees. However, private plans must be approved by the Secretary of Labor and must be equal to, or better than the benefits provided by the government plan. In addition, private plans must pay a specified amount each year as a contribution to the government plan.

Workmen's Compensation

Commonwealth Law 45 of April 18, 1935, as amended, establishes a workmen's compensation program. This insurance is compulsory and is payable by all employers at rates varying according to the type of industry and/or work performed by their employees. Under the law, the State Insurance Fund, a Puerto Rican government agency, is the exclusive underwriter. The law provides for full medical care, payments for temporary disability, permanent disability and pensions to widows and children in case of death.

Article 20 of this law provides that when an accident is covered by the State Insurance Fund, the worker cannot sue the employer. There is a merit rating system by which a penalty of up to 30 percent or a credit up to 30 percent in the premium rate may be imposed upon, or granted to the employer, depending upon his accident record.

Noncompliance with the law holds the employer liable to his employees in case of accidents, in addition to the penalties which might be imposed by the government. Of particular importance is the penalty imposed by Article 3-B in those accidents that are attributable to a deficiency duly notified by the Accident Prevention Bureau of the Department of Labor and Human Resources but which the employer had failed to correct. The penalty imposed is of an amount equal to the compensation which the worker would receive from the Fund.

Closing Act

Article 553 of the Penal Code of Puerto Rico provides that commercial establishments shall remain closed to the public on Sundays, and on certain holidays established by law, throughout the entire day, and on others from 12:00 noon onwards. The statute also provides that on regular working days such establishments shall close at 6:00 p.m. with the exception of Fridays when they may close at 9:00 p.m. However, manufacturing establishments, hotels, establishments operated by their owners, and establishments specifically designated as being in tourism zones, among others, are expressly excluded from the law.

Christmas Bonus

Commonwealth Law No. 148 of June 30, 1969, provides that each employer shall pay to each of his workers (who fulfills certain specified requirements) an annual bonus of two percent of wages or salaries up to a maximum of $10,000 earned by said employee between October 1st of the preceding year and September 30th of the year in which the bonus is to be paid. The total amount of the bonus payments to be made to all employees of an establishment may not exceed 15 percent of the net earnings. The bonus must be paid during the first two weeks of December of each year.

U.S. Social Security Taxes

The U.S. law is applicable in Puerto Rico and taxes are paid to a local U.S. Internal Revenue office in Puerto Rico in the same manner and at the same rates as are applicable on the Mainland.

Method of Payment of Wages

The general rule in Puerto Rico is that employees must be paid weekly and in cash. However, the Department of Labor and Human Resources in certain instances and if certain requirements are met, will permit payment by check. Deductions or withholdings from employees' earnings shall be only those authorized by law.

Statue of Limitations

Local law authorizes the Department of Labor and Human Resources to bring suit on behalf of employees and, of course, the employee may sue on his own behalf.
In either case, an employee is entitled to an indemnity as liquidated ~~damages~~ damages to the amount of his wage claim. Such claims may be entered covering the ten year period immediately preceding the date on which the action is filed and may be brought by either present or past employees, although in the latter case such action must be filed within three years after the date of termination of employment. Accordingly, even though Federal law requires generally that payroll records must be retained for only three years, it is virtually imperative that employers in Puerto Rico preserve all payroll and related records for at least ten years.

Vacation and Sick Leave

The Puerto Rico Minimum Wage Board is empowered to provide, by mandatory degree, for vacation with pay. The provisions vary between industries and should be checked to determine the requirements of any particular industry.

Holidays

There are no legislative requirements for paid holidays in the manufacturing industries.

Appendix IV

TOPICS OF DISCUSSION RELATING TO
THE EMPLOYMENT OF WOMEN IN THE DRUG INDUSTRY
IN PUERTO RICO

1. The size of employment

2. The proportion of women at different levels and types of occupations.

3. The industry-specific skills.

4. Problems encountered, if any in hiring, maintaining and promoting women.

   - Skill levels
   - Education levels
   - Unavailability of women for job openings
   - Lack of response to job openings
   - Company pressure towards one gender
   - Social pressure towards one gender
   - Marital status, children
   - Women may be temporary
   - Women have higher absenteeism and turnover rates
   - Women perform better
   - Women make better team members
   - Women are good trainers
   - Women's perceptions regarding specific jobs

5. The practice of hiring and promotion

   - At low skill with training to follow
   - Hiring initially with high skills and educational levels
   - Internal promotion
   - Hiring from outside the firm

6. On the job training

   - Availability of special programs for women
   - Women may require more effort to train
   - Availability of management training programs
   - Availablility of employee advancement and career opportunities through scholarships or similar programs

7. Reasons to exclude women from specific occupations

   - Working hours
   - Lack of day care facilities
   - Legal constraints

8. Male/Female distinction problems in promotion

   - Interest of women in advancement
   - Suitability of women for advancement to higher level jobs
   - Attitude of women with respect to increased responsibility of higher level jobs
   - Career orientation
   - Acceptability of women as supervisors
   - Degree of decisiveness and aggression
   - Suitability for negotiations
   - Emotional response to task oriented demands
   - Acceptance of criticism
   - Frequency of intra-office discord

9. Equal opportunity in the firm

   - Gender similarity in upward mobility
   - Preference to work for men
   - Equal applicability of fringe benefits

10. Suitability of vocational and technological organizations in providing labor of required skill

11. The process of recruiting

12. Recommendations to enhance the participation of women and their economic progress in society.

   - particular to the drug industry
   - particular to manufacturing
   - at the legislative level
   - at the overall societal level