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CENTER FOR CHICANO STUDIES SANTA BARBARA, CALIFORNIA 93106

December 6, 1988

Cynthia M. Duncan, Associate Director
Rural Economic Policy Program
The Aspen Institute for Humanistic Studies
P.O. Box 959
Durham, NH 03824

Dear Mil:

Thank you for your December 1 letter which included the announcement of grants for research on the rural poor in the United States. Incidentally, please send me more so that I can distribute them among colleagues in my and other California campuses.

I was very surprised and pleased with the announcement: surprised --amazed is a better word-- by how quickly you produced it; and pleased by its contents. Indeed, the inclusion of qualitative --ethnographic-- research as a major component of the program, among other things, reflects and satisfies my concerns and interests. As a result, I feel that my participation in the Wye Plantation meeting was more than worthwhile.

I am also happy to report that, as a result of my participation in the meeting, I have been receiving a fair amount of correspondence from other participants interested in my research. This has been an added benefit and indicates that you accomplished more than what you setout to do.

I will, undoubtedly, prepare a proposal for the Rural Economic Policy Program. Therefore, I will be keeping in touch with you over the next two months. Furthermore, I am in the process of inciting several of my colleagues at UCSB to do as well: Thomas Harding who works in Appalachia and Manuel Carlos who works in California. You might also be hearing from them.

Finally, I would like to request copies of Calvin Beale's rural poverty maps. Do you have access to them or could you recommend the procedure I should follow to obtain them?

Sincerely

J.V.Palerm

Juan Vicente Palerm

file – make
– have Dr. Palerm in
Reading

THE FORD FOUNDATION
320 EAST 43RD STREET
NEW YORK, NEW YORK 10017

September 7, 1988

PROGRAM DIVISION
HUMAN RIGHTS AND GOVERNANCE PROGRAM

Dr. Juan Vicente Palerm
Director
Center for Chicano Studies
University of California
Santa Barbara, CA 93106

Dear Juan:

Please accept my apology for the long delay in responding to your letter of May 31. Between business travel, a short vacation, and the press of other business, this has turned out to be a hectic summer that, among other things, prevented me from writing to you sooner.

From your letter, it sounds that you have been quite busy yourself, particularly on the SCR 43 Task Force. That sounds like an interesting and important effort and, naturally, I was pleased to hear that your IUP-supported research assisted your participation in the project. I also was happy to learn that the research has generated new project ideas for further research on Chicano/Mexican farmworkers, rural enclaves and agriculture in California.

While I would like to be able to say that we could be of assistance in developing this work, I must inform you that Foundation support will not be possible. Our program does not support individual, university-based Latino research centers for research or program development, preferring instead to work through national networks like the IUP. In part, that decision reflects the Foundation's role as a national funder. It also reflects a desire to avoid the problems we would have in picking and choosing among the many worthy university-based Latino research centers for development support. My best advice, at this stage, would be to finish the manuscript for the IUP project and to send Susan Sechler and me a copy with a letter describing your ideas for new research and training activities. We could then get back to you with some reactions and advice about whether possible support for the agenda or pieces of it might be available here or elsewhere.

I look forward to hearing from you and promise that the reply the next time will be considerably quicker.

With warmest regards.

Sincerely,

Bill

William A. Diaz
Program Officer

cc: Susan Sechler (w/cy incoming)
(8282)

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CENTER FOR CHICANO STUDIES SANTA BARBARA, CALIFORNIA 93106

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SECRETARY
FORD FOUNDATION

May 31, 1988

William A. Diaz
Program Officer
Human Rights & Governance Program
The Ford Foundation
320 East 43rd Street
New York, NY 10017

Dear Bill:

Thank you for your letter of May 19, 1988 concerning our research on Chicano/Mexican enclaves in rural California, as reported in UC MEXUS NEWS. Unfortunately, our final report to IUP is behind schedule but we should have it finalized sometime this summer. Shortly afterwards Victor Garcia will also finalize the first draft of his Ph.D. dissertation on farm worker's households which, I am sure, will make a substantial contribution to our understanding of agricultural workers in California. We will keep you abreast on the progress of our work.

The main reason for falling behind schedule in our IUP reporting is that I have become deeply involved in the preparation of the University of California's response to the State Legislature's challenge to organize and develop public policy research on Hispanic issues, as recommended in the Senate Concurrent Resolution No. 43. (General information on UC's SCR 43 Task Force may be found in the same UC MEXUS NEWS issue that reported on our IUP research. I am also enclosing a copy of SCR 43 for your information.) The task of producing this report has been much more tedious, complex and time consuming than expected and, hence, other projects were inevitably delayed. Nonetheless, we are now in the process of drafting the SCR 43 response and I should be able to return to my other projects in the very near future. You will be pleased to learn that my contributions to the SCR 43 report, which will serve to establish a UC prioritized research agenda on Hispanic issues, were greatly facilitated by the IUP supported research. Therefore, in a way, one of the fundamental IUP goals (i.e., to establish vehicles of communication and exchange between academics and policy makers) will have been accomplished.

Now that our two year IUP research and training project is about to come to a close, we are in an excellent position to generate a number of research proposals which address specific public policy issues with respect to farm workers, Chicano/Mexican rural enclaves, and agriculture in California.

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Indeed, over the past two years we have built a solid research infrastructure made up of trained investigators and empirical knowledge which can now be used to pursue further research. Since we are going to need assistance in the form of financial support in order to carry out our prospective research and training agenda, I would very much appreciate any suggestions you might have on this matter.

At a recent meeting held in Fresno (Working Group on Farm Labor and Rural Poverty organized by the California Institute for Rural Studies), I had the opportunity to speak at length with Dr. Leo Estrada (UCLA) about these matters. Leo suggested that, considering the uniqueness, importance and wealth of our research findings, we should immediately proceed to apply for research development funds in order to develop and streamline a number of interrelated and thematically specific public policy research proposals to be undertaken by the Center for Chicano Studies at UCSB under my direction and supervision. He was of the opinion that with the assistance of a few experts knowledgeable in some of the topics we plan to address (housing, health, education, economic development, etc.,) and an experienced grant writer, in a short period of time we should be able to generate a host of viable proposals that could earn us long term financial support. Leo thought that support for research development might be forthcoming from agencies such as the Ford Foundation, Aspen Institute, IUP and the California Policy Seminar. He suggested that I contact you and Susan Sechler in order to make my initial inquiries.

I will be taking an in-residence sabbatical leave from both the directorship of the Center for Chicano Studies and instructional responsibilities (Anthropology) during the forthcoming academic year, 1988-89. Therefore, I will be well positioned, as of this late summer, to devote a good portion of my time to this particular endeavor. Overall, I estimate that I will need support to pay consultants, two research assistants, a grant writer, and part of my time in order to accomplish my goals. All this adds up to a ball park figure of approximately $50,000. I feel quite confident that with this support we would be able to generate a long range program of public policy research on issues affecting Hispanics in rural California and of research training activities for graduate and undergraduate minority students.

I look forward to your suggestions and recommendations.

Un abrazo

J. V. Palerm

Juan Vicente Palerm

enc: 2

RESOLUTION CHAPTER 146

Senate Concurrent Resolution No. 43—Relative to the state's Hispanic population.

[Filed with Secretary of State September 18, 1987.]

LEGISLATIVE COUNSEL'S DIGEST

SCR 43, Presley. The state's Hispanic population.

This measure would make various findings and declarations regarding the state's Hispanic population and resolve that the University of California take certain actions to assist in finding solutions to various enumerated problems facing the state and the state's Hispanic population.

This measure would request that the university initiate efforts in helping coordinate the state's resources toward a comprehensive approach to these problems, as specified, and that the university seek suitable research and graduate training funds, as specified.

This measure would request that the university consider formation of a social research policy and priorities task force and advisory committee to help advise and coordinate the university's efforts, as specified.

This measure would request that these policy research efforts concentrate on, but not be limited to, health, education, employment, government participation, housing, welfare, criminal justice, and immigration policy areas, as specified.

This measure would request that the university consider, as an initial priority, the thorough cataloging and collecting of information on existing efforts and available funding so as to avoid duplication of efforts, as specified.

The measure would provide for a specified report by the university and for development within the university of a focused and coordinated capacity to do research and to address concerns raised by the measure.

WHEREAS, There is in California a large and growing population of persons of Hispanic origin; and

WHEREAS, It is estimated that within the next 40 years, this group will comprise the largest single element of the state's population and currently is the state's largest minority population; and

WHEREAS, A substantial proportion of this population has a common heritage, with strong cultural and ethnic identities that are shared with the people of Mexico and other Latin American countries, presenting a unique opportunity for cooperative efforts to address the pressing concerns of our Latin American neighbors as they relate to California's problems as a whole; and

WHEREAS, California's history and development have relied heavily upon the contributions of its Hispanic population, helping to create a rich cultural heritage, prospering economy, and social environment admired around the world; and

WHEREAS, Current statistics demonstrate that large segments of the Hispanic population have not benefited fully from California's advances, a fact that is reflected in high levels of poverty and low economic opportunity, low levels of political participation, substantial underrepresentation in government at all levels, high academic dropout rates, high concentration of limited-English-speaking and writing ability, and pervasive discrimination in numerous aspects of everyday life, indicating that the enormous resources available to the state have not been adequately utilized to plan, strategize, and provide direction or develop resources designed to overcome the obstacles to full participation faced by such a large and important segment of California's population; and

WHEREAS, It is in the interest of all the citizens of the State of California that barriers which inhibit full participation in the educational, political, scientific, social, and economic activities of the state be eliminated; and

WHEREAS, Although there has been steady growth in the number of Hispanics participating in the educational, political, scientific, social, and economic activities of the state, Hispanics remain seriously underrepresented in all of these areas in comparison to the size of the population; and

WHEREAS, The continued underutilization and underdevelopment of the resources that exist within the growing Hispanic population threatens the stability of California's economy and its social structure; and

WHEREAS, For example, if the largest segment of California's work force is unprepared to compete for jobs in a highly technical and skilled marketplace, there is a strong likelihood that employers would look elsewhere to locate and take with them the opportunity for high-paying employment. Lower wages mean less economic power and a reduction of the ability of taxpayers to support the operation of government and the programs it implements for the benefit of all of its citizens; and

WHEREAS, As one example, the rising portion of the state's wage earners who will come from the Hispanic work force, and their lower comparative wage rates, will have a critical economic impact on funds available for retirement programs, workers' and unemployment compensation, and other employee benefits for all employees and their families; and

WHEREAS, The new Federal Immigration Reform and Control Act while alleviating some problems may exacerbate others and create new issues that must be researched or addressed; and

WHEREAS, Passage of Proposition 63, the English as official language constitutional amendment, poses new issues which must be examined and dealt with in ways which will benefit all Californians; and

WHEREAS, The serious economic and social problems being experienced by Mexico and other major sources of immigration to California will inevitably affect the state's Hispanic population; and

WHEREAS, It would be of invaluable assistance in seeking solutions to many of these problems to have the benefit of a thorough understanding of the history, demographics, experience, and potential of California's Hispanic population; and

WHEREAS, It has become imperative that resources be focused so as to stimulate research and to promote evaluation and analysis of these problems by knowledgeable academicians, members of the professional and business communities, government officials, political and community leaders, and individual concerned citizens so that they may propose solutions that will benefit all segments of our society; and

WHEREAS, The Hispanic population is so heterogeneous and comprised of so many subpopulations that are differently affected by policy decisions, that solutions to many policy problems can be found only by rigorous study and understanding of the diverse needs and expectations presented by this group's members residing in the state; and

WHEREAS, Through the enormous resources made available through the University of California, the state would benefit from the development of research which would promote the evaluation and analysis of these problems and develop reliable information upon which, with the assistance of the university, strategies can be constructed and solutions can be proposed; and

WHEREAS, The University of California is already demonstrating a strong concern in these problem areas, having established centers for Chicano, Mexican, and Latin American studies on various campuses, a linguistic minority research project, the nine-campus University of California Consortium on Mexico and the United States (UC Mexus), which brings together scholars and scientists from the university and Mexico to address critical issues, and similar focused research and education programs; now, therefore, be it

Resolved by the Senate of the State of California, the Assembly thereof concurring, That the Legislature of the State of California requests that the University of California initiate efforts in helping to coordinate the state's academic, professional, governmental, business, and community resources toward a comprehensive approach to these problems and their solutions, and that the university seek suitable research and graduate training funds commensurate with the university's major and diverse research mission and programs to aid in helping resolve crucial state problems; and be it further

Resolved, That the university make every effort to seek funds from

foundations, private sources, state government, and from federal funds which are becoming available to states, such as the $1 billion included in the Immigration Reform and Control Act to assist states in its implementation, some of which is earmarked for education; and be it further

Resolved, That the university consider formation of a social research policy and priorities task force to help advise and coordinate the university's efforts in this direction and to involve both public and private institutions and sectors in these efforts; and be it further

Resolved, That the university consider establishing an advisory committee as part of the task force to assist in the development of the report. In addition to representatives selected by the university, the university is requested to include three public members, one each to be designated by the Speaker of the Assembly, the President pro Tempore of the Senate, and the Governor. It is the intent of the Legislature that persons appointed or selected to serve on the task force and on the advisory group be selected primarily from the Hispanic community or from groups that represent that community, or both; and be it further

Resolved, That these policy research efforts concentrate on, but not be limited to, health, education, employment, government participation, housing, welfare, criminal justice, and immigration policy areas, using extant data sets when possible and creating new ones when needed; and be it further

Resolved, That the university consider as an initial priority, the thorough cataloging and collecting of information and data on existing efforts and available funding so that the task can be organized in a manner that will avoid the duplication of effort and cross purposes, and work toward goals which benefit and have the support of all responsible elements of our society; and be it further

Resolved, That the university report to the Legislature within nine months after the date this resolution is chaptered its response to this challenge, and how it plans to approach the task given to it through this measure. This report will include a discussion of the time frames contemplated by the university, the resources that will be needed for this effort, existing resources that the university anticipates tapping into, and the perceived benefits that the university believes this endeavor will bring to the people of this state; and be it further

Resolved, That the university, after its report to the Legislature, continue its efforts as expressed in this measure, with the goal of developing within the university a focused and coordinated capacity to do research, provide instruction, and develop resources that specifically address concerns raised in this resolution; and be it further

Resolved, That by passage of this resolution, the Legislature once again expresses its confidence in the ability of the nation's greatest university system to assist the state in addressing these important public policy problems and meeting the full potential of California

as we prepare to enter the 21st century; and be it further

Resolved, That the Secretary of the Senate transmit a copy of this resolution to the Regents of the University of California.

O

UC Initiates Major Study on Hispanic Issues

The University of California has undertaken a major project to assess the needs of the growing Hispanic population of the State of California, and to propose a research agenda for the next several years to assist the state in its efforts to meet those needs. The project brings together for the first time scholars and programs from all of the campuses which concentrate on Hispanic, Latino or Chicano research and directs their efforts towards urgent policy-related questions.

The project was proposed as Senate Concurrent Resolution 43, introduced by Senator **Robert Presley** of Riverside in April of 1987. The resolution gathered strong support in the legislature and the University and was adopted in September. Specifically, SCR 43 requests that the University of California "initiate efforts in helping coordinate the state's resources toward a comprehensive approach" to the questions facing the state and its Hispanic population, including issues related to health, education, employment, government participation, housing, welfare, criminal justice, and immigration policy.

To accomplish the work necessary for such far-reaching planning, the University has established the SCR 43 Task Force, which involves hundreds of University of California faculty, staff and students, representatives of the community, and public officials with responsibilities related to the project. The SCR 43 project is led by UC MEXUS Director **Arturo Gómez-Pompa**, who chairs an Advisory Committee of eighteen faculty members and public representatives established by UC Senior Vice President **William Frazer**. Detailed organization of the work, collection of information from the University and the public, and development of a preliminary report is the responsibility of an Executive Committee appointed by Gómez-Pompa. Funding to support the work of the Task Force has been awarded by UC President **David Pierpont Gardner**.

"The SCR 43 project is a significant opportunity for the University and the state to work together towards the future," said Gómez-Pompa. "The University already has evidenced strong interest in Hispanic issues through the establishment of several campus and Universitywide programs and the support of faculty research in these areas. It is our objective with the SCR 43 project to bring together these extraordinary resources and to focus their intellectual power on the potential the Hispanic population holds for the future economic, cultural and social richness of the state. I am very pleased that UC MEXUS can play a pivotal role in this enterprise."

The membership of the SCR 43 Advisory Committee demonstrates the breadth of experience, interest, and commitment necessary to address such wide-ranging and important topics. Its members include **Rudolfo C. Aros**, staff attorney, Western Center on Law and Poverty, Sacramento; **Wayne Cornelius**, director of the Center for U.S.-Mexican Studies at UC San Diego and an expert on Mexican immigration and industrial labor; Assistant Vice President for Academic Affairs **Eugene Cota-Robles**, who has developed several programs for Hispanics in education; **Stephen Gliessman**, director of the Agroecology Program at UC Santa Cruz; **David Hayes-Bautista** of the UCLA School of Medicine, director of the Chicano Studies Research Center and a specialist in public health administration; **Michael Kearney** of the UC Riverside Anthropology Department, who works in the area of Mexican immigrant populations; **Eliud Martínez** of Riverside's Literature and Languages Department, a scholar of Chicano literature and former chair of the Chicano Studies Department; anthropologist **Juan Vicente Palerm**, director of the Center for Chicano Studies at UC Santa Barbara and an authority on rural populations; **Rosa Perez**, vice chancellor for educational services, San Francisco Community College District; **Eloy Rodríguez**, an environmental biologist at UC Irvine who has developed and directs science programs for Hispanic students; **Jaime Rodríguez**, a historian of Mexico and former Dean of Graduate Studies and Research at UC Irvine; **Vicki Ruiz** of the UC Davis Department of History, whose research focuses on Mexican women; **David J. Sánchez, Jr.**, of the UCSF Department of Family and Community Medicine and president of the Police Commission of the City and County of San Francisco; **Alex Saragoza** of the UC Berkeley Department of Chicano Studies, and chair of the Center for Latin American Studies; **Jamie Sepulveda Bailey**, the Governor's liaison to California's Hispanic Community; **Faustina Solis**, assistant chancellor and provost of Third College, UC San Diego; and **Johannes Wilbert**, an anthropologist and director of the UCLA Latin American Center. The Committee is advised and assisted by **Belle Cole**, director of research and public policy in the Office of the Senior Vice President of the University.

The Executive Committee already has organized and conducted many workshops and meetings throughout the state, soliciting information and recommendations from other scholars, public officials responsible for programs of importance to the work, and the general public. Its members, who also serve on the Advisory Committee, were selected because of their wide-ranging experience with and expertise in the issues most central to the resolution's charge. David Hayes-Bautista, who chairs the Committee, also coordinates the work on health and welfare. Other

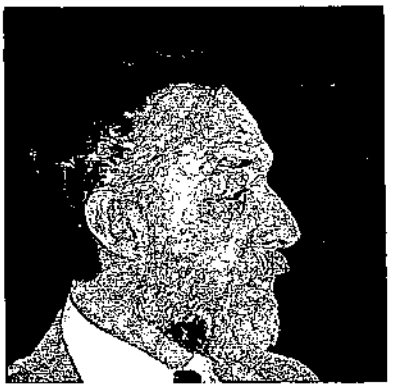
members of the Executive Committee, and their areas of responsibility, include: Arturo Gómez-Pompa (coordinator); Alex Saragoza (the California economy and the Latin American-origin labor force); Juan Vicente Palerm (immigration and settlement patterns); David J. Sánchez, Jr. (education and criminal justice); and Jaime Rodríguez (the University and the Hispanic community). Other activities are planned in an effort to reach the largest possible number of contributors in the very short time frame allowed by the resolution. A data base of organizations, individuals, and publications is being developed, and a survey of interests and recommendations is being issued from the UC MEXUS Universitywide Headquarters. Those who wish to participate in the survey but do not receive it are invited to contact UC MEXUS at Riverside, (714) 787-3519, to request materials.

Following Advisory Committee review, a final report and recommendations will be submitted to the Office of the President late in the spring of 1988, for subsequent transmittal to the legislature. It is hoped, however, that the final report will in fact mark the beginning of increasing focus on the potential the Hispanic population holds for the University and the state. According to Gómez-Pompa, the report will contain not only an analysis of the issues, but a series of recommendations for greatly increased research activities which will assist in the development of effective policy. "It is our strong desire," he said, "that the results of this work will reach far into the future, and be of benefit to those many individuals and organizations in the state who share with us the concerns expressed in the Resolution." ■

Arturo Gómez-Pompa

David Hayes-Bautista

Juan Vicente Palerm



Jaime Rodríguez

M. Christine Torrington

David Sánchez, Jr.

Alex Saragoza

Members of the UC SCR 43 Executive Committee

THE DYNAMICS OF TRADE AND EMPLOYMENT

Edited by
LAURA D'ANDREA TYSON
WILLIAM T. DICKENS
JOHN ZYSMAN

BALLINGER PUBLISHING COMPANY
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4 THE DOMESTIC EMPLOYMENT CONSEQUENCES OF MANAGED INTERNATIONAL COMPETITION IN APPAREL

Carol A. Parsons

The future looks bleak for the domestic apparel industry. With a $17.6 billion trade deficit in 1986 and a set of foreign competitors that hire labor at wages that are often no more than 15 percent of U.S. wage levels, it is easy to be pessimistic about the employment prospects of workers in the domestic apparel industry. Innovative production and marketing strategies notwithstanding, the labor intensity of apparel production in combination with the enormity of the wage disparity between the rich and the poor countries means that domestic employment in apparel production will almost certainly continue to fall.

UNDERSTANDING FOREIGN TRADE AND DOMESTIC EMPLOYMENT IN APPAREL

This chapter approaches the question of how international trade affects domestic employment in the apparel industry. It begins by reviewing the effects of trade on domestic employment. While most macroeconomic studies conclude that trade has had a relatively small effect on employment when compared to productivity improvements, these studies are generally unilluminating. By insisting on a formal separation between the effects of trade and those of productivity improvements, these studies

miss the obvious connection between the two: imports increase and domestic firms attempt to reduce the labor content of their products in order to compete with their low-wage developing country competitors. Input-output analyses provide a useful counterweight to this approach. By estimating the labor content of imports, these studies generate estimates of the reduction in labor demand and conclude that imports have dramatically reduced domestic "job opportunities," particularly for female, minority workers.

The chapter then briefly describes the institutions that have arisen to manage international trade in the textile-apparel business. Rather than reciting the history of the Short-Term Agreement, the Long-Term Agreement, and the Multifiber Agreement, the discussion will be limited to identifying the most frequent ways in which these agreements break down.[1] In particular, the use of quotas has had and continues to have the unfortunate effect of forcing trade regimes to continually widen their span of control to include more products and more types of fiber. Furthermore, even as the scope of managed trade has expanded, the structure of trade management has encouraged participants to escape from the controls in two ways. On the one hand, quotas encourage producers to shift production into uncontrolled categories; on the other hand, quotas induce producers to shift production toward more valuable output and thus maximize the value of the product mix within quota categories. MFA quotas thus have a doubly perverse effect: the value of controlled imports increases, as does the range of controlled categories.

Finally, the chapter examines the strategic responses open to domestic apparel producers and evaluates their economic and political efficacy as competitive responses to international competition. This is a critical part of assessing the impact of trade on employment because in a market economy the demand for labor is derived from demand for the product. The competitive success of firms is a crucial determinant of employment levels. Generally, there are three strategies that apparel firms can pursue: (1) the maintenance of some level of protection; (2) a shift out of apparel manufacturing; or (3) a breakthrough in the automation of the apparel production process. Taken together, the possible responses—from international free trade to a wave of large-scale automation—imply one certain outcome: employment in apparel will not increase. Put more bluntly, the best that labor can hope for is a set of responses by governments and firms that will slow the rate of domestic job loss.

THE DOMESTIC APPAREL INDUSTRY

The U.S. apparel industry is a good approximation of the atomistic competition described by Adam Smith. There are over 15,000 firms in the industry, and the top four firms in almost all product segments account for less than 25 percent of total shipments (see Table 4–1). Work clothing for men and boys, a highly concentrated and heavily capitalized industry segment, is the exception, with the top four firms delivering 49 percent of total shipments. This segment, which is primarily comprised of blue jeans, is dominated by the two largest apparel firms in the country, Levi Strauss and Blue Bell. In its standard product, size, and market power, the work clothing segment differs sharply from the norm.

Since production has relatively low capital requirements, outside of these concentrated industry segments, firms enter and leave the industry easily. Capital per apparel worker was $599 in 1981—up 75 percent from $341 in 1974, yet still quite low compared to the textile industry, where capital per worker increased by 91 percent over the same period, from $1,329 in 1974 to $2,542 in 1981 (U.S. Department of Commerce 1984). In 1981, the most recent year for which data are available, new capital expenditures in apparel were $650 million in the apparel industry versus $1.7 billion in the textile industry and $65 billion in all nondurable manufacturing (Nehmer and Love 1985: 235).

Employment and Wages and Job Loss

The apparel industry's pattern of investment is evident in its employment structure (see Tables 4–2 and 4–3). The industry is labor intensive; production workers account for over 85 percent of all employees. The workers in apparel are also consistently older, composed of more women and minority workers, and less educated than workers in manufacturing as a whole. Women account for over 80 percent of the work force in apparel, while minority workers account for approximately 19 percent (Nehmer and Love 1985: 235). As significant—especially in terms of potential mobility—is the relative lack of education among apparel workers. In 1975, the most recent year for which data on education are available, the apparel industry was the largest employer of people with less than a ninth-grade education: of the industry's 1,186,000 employees, approximately 400,000 had not completed the ninth grade (Arpan et al. 1982: 10–11).

Table 4-1. Concentration Ratios in the Apparel Industry, 1984.

SIC	Segment[a]	Total No. of Establishments	Total Employment (in thousands)	No. of Est. with more than 20 Employees	Percent of Industry Shipments by 4 Largest Companies
2311	MB suits and coats	737	69.5	270	21
2321	MB shirts and nightwear	928	92.3	249	17
2327	MB separate trousers	514	53.3	179	25
2328	MB work clothing	656	94.4	81	49
2331	WM blouses and shirts	1415	81.4	463	12
2335	WM dresses	6953	149.5	4480	8
2337	WM suits and coats	1672	71.5	605	15
2341	WC underwear	698	71.2	219	22
2361	Children's dresses and blouses	519	32.2	145	15

Source: U.S. Department of Commerce (1984).

[a]MB = men's and boys'.
WM = women's and misses.
WC = women's and children's.

Table 4-2. Production Employment, Average Weekly Hours, and Hourly Earnings of Production Workers in Apparel, 1970–1984.

Year	Employment	Average Weekly Hours	Hourly Earnings
1970	1,196.2	35.3	$2.39
1971	1,177.0	35.6	2.49
1972	1,208.0	36.0	2.60
1973	1,249.7	35.9	2.76
1974	1,174.9	35.2	2.97
1975	1,066.6	35.2	3.17
1976	1,134.3	35.8	3.40
1977	1,129.4	35.6	3.62
1978	1,144.6	35.6	3.94
1979	1,116.8	35.3	4.23
1980	1,079.4	35.4	4.56
1981	1,059.5	35.7	4.97
1982	981.2	34.7	5.20
1983	984.3	36.2	5.37
1984	1,016.5	36.4	5.53

Source: International Ladies' Garment Workers' Union Research Department (1985).

Low-wage jobs are the norm in apparel, where a worker's average annual wages are below the poverty line for a family of four.[2] Hourly wages in the industry fell from 73 percent of the average manufacturing wage in 1968 to 61 percent in 1982. Over the same period, apparel workers' real hourly wages declined by 16 percent.

Industry employment has plummeted by 700,000 jobs since 1960 (Barmash 1987: 25), with 180,000 of those lost between 1973 and July 1987 (Starobin 1987). Compounding the social problem of job loss is the fact that it does not occur smoothly or incrementally through, for example, attrition or layoffs. Instead, it frequently occurs discontinuously as entire plants close and companies go bankrupt, eliminating all jobs at once. And unlike the case of plant closures in the Sunbelt, where new plant openings have more than counterbalanced closings, the 3,200 apparel-industry firms that have closed in the United States in the last decade have not been replaced by the entry of new firms (de la Torre et al. 1984: 23). Evidence of this disruption is clear

Table 4–3. Apparel Employment by Industry Segment, 1986 (in thousands).

SIC	Segment[a]	Total Employment	Production Employment	Average Hourly Earnings
2311	MB suits and coats	72.1	62.0	$5.95
2321	Men's shirts	89.4	70.7	5.33
2327	MB trousers	55.8	44.9	5.27
2328	MB work clothing	93.5	83.2	5.34
	Total	310.8	260.8	—
2331	WM blouses	83.1	68.7	$4.72
2335	WM dresses	114.0[b]	93.2	5.55
2337	Women's suits and coats	53.2	46.8	5.41
	Total	250.3	208.7	—
2361	Child's dresses/blouses	31.0	26.1	$5.16
2363	Child's coats and suits	5.1	4.7	5.27
	Total	36.1	30.8	—

Source: U.S. Department of Commerce (1987).

[a]MB = men's and boys'; WM = women's and misses.

[b]Estimated 1985 data.

from the trade balance in apparel, which has deteriorated sharply in the 1980s, plunging from −$4.7 billion in 1980 to −$17.6 billion in 1986 (see Table 4–4).

The Structure of Demand

While imports were surging into the domestic market, the industry was also shaken by a radical shift in the level and composition of demand for apparel. The shift from traditional suits and dresses to casual wear imposed diverse, and often conflicting, demands on the industry. The increase in market segmentation that accompanied the more relaxed rules about "appropriate" dress made manufacturing flexibility, quick distribution, and a wide product range sources of competitive advantage, all factors that favored the specialized, small firms that dominate

Table 4–4. U.S. Imports, Exports, and Trade Balance in Apparel, 1967–1986 ($ millions).

Year	Imports	Exports	Balance
1967	595.2	118.6	−476.6
1968	786.0	130.8	−655.2
1969	1,012.8	163.8	−849.0
1970	1,152.8	154.5	−998.3
1971	1,401.5	164.1	−1,237.4
1972	1,718.3	198.0	−1,520.3
1973	1,955.5	229.3	−1,726.2
1974	2,095.4	332.7	−1,762.7
1975	2,318.1	340.6	−1,9[illegible]
1976	3,256.5	434.2	−2,822.3
1977	3,649.7	524.1	−3,125.6
1978	4,833.3	551.0	−4,282.3
1979	5,015.0	772.1	−4,242.9
1980	5,702.8	1,000.6	−4,702.2
1981	6,756.1	1,032.1	−5,724.0
1982	7,386.1	774.9	−6,611.2
1983	8,649.3	663.7	−7,985.6
1984	12,029.0	637.9	−11,391.1
1985	16,056.0	755.0	−15,301.0
1986	18,554.0	899.0	−17,655.0

Source: Unpublished U.S. Department of Commerce data.

the domestic industry. The explosion of demand for denims and corduroys and the increasing demand for natural fabrics, however, militated against niche strategies for national apparel industries as a whole simply because the fastest growing market segments were in garments that required less construction time and therefore lower labor input per unit.

Changes in synthetic fiber technology and relative material prices also had a significant effect on the competitive conditions of the industry. The popularity of man-made fibers during the 1960s gave the United States a brief period of comparative advantage, since the production of synthetic fibers and fabrics was centered there and provided its apparel makers with a ready supply of fashionable and competitive inputs. Man-made fibers captured over 50 percent of the world's consumption of textile fibers by 1979, with synthetic fibers accounting for over three-quarters of this total. Apparel manufacturers benefited considerably as the high level of innovation in processing and production

in the fiber and textile complex drove down prices throughout the 1960s and 1970s. By the 1970s, however, this advantage faded as synthetic fiber technology spread to fast-growing markets in low-wage countries.

The shift toward synthetic fabrics also had a perverse effect on competitiveness. Lower material costs, which emphasized the role of other factors in the total cost structure, accentuated the significance of labor cost differentials, thus shifting the terms of competition to the advantage of low-wage producers.

INTERNATIONAL TRADE IN APPAREL

In 1958 almost every garment sold in the United States was made in the United States, and total imports were less than $300 million. Twenty-five years later, one of every four garments sold in the United States was made somewhere else, and imports had increased to an equivalent wholesale value of $13.5 billion, or 25 percent of the total wholesale value of all apparel sold in the country (American Apparel Manufacturers Association 1984: 2). Table 4–5 details the loss in market share of domestic apparel producers from 1973 to 1983, a period of substantial growth in apparel imports. The fact that real consumption was growing during this period only makes the market share data more disturbing. Unlike the apparel market in Western Europe, real apparel

Table 4–5. Market Share of U.S. Apparel Production of Domestic Apparel Consumption (percentages).

	1973		*1983*	
	Units	*Dollars*	*Units*	*Dollars*
All tailored clothing[a]	77	85	60	70
Undergarments and nightwear[b]	96	98	90	92
Total	80	88	67	75

Source: American Apparel Manufacturers Association (1984: 2).

[a]Tailored clothing included coats, dresses, jackets, skirts, knit and woven shirts and blouses, sweaters, play clothes, trousers, jeans, slacks, and shorts.

[b]Undergarments and nightwear includes hosiery, robes and dressing gowns, and other apparel.

consumption in the United States grew at the healthy pace of 4.1 percent annually between 1970 and 1985 (Council of Economic Advisors 1987). This increase, however, did not benefit the domestic industry. Imports captured domestic growth along with a growing share of the entire domestic market for apparel.

After 1980 the value of apparel imports skyrocketed, growing at approximately 15 percent annually. Two factors encouraged import penetration: the appreciation of the dollar and the lackluster export performance of domestic apparel manufacturers. While the strength of the dollar explains some of the import surge from Western European producers during this period, it does not explain the surge from Asian producers. The value of the currency of the developing countries in Asia, especially Hong Kong, South Korea, and Taiwan—three of the Big Four (China is the fourth) apparel exporters into the U.S. market—is tied to the value of the dollar. A weighted index of the values of Asian currency constructed by the Federal Reserve Bank of Atlanta in 1986 (Rosensweig 1986) indicates that on a trade-weighted basis, the dollar depreciated only slightly against the Asian currencies after 1985. Thus even as the dollar depreciated against the yen and Western European currencies, over relatively long periods of time the terms of trade between the dollar and the currencies of the largest Far Eastern apparel producers did not change substantially. In the short run, the Asian countries tended to peg their currencies' value to the dollar's value, while over the longer term some devalued their own currencies against an already depreciating dollar.

The surge in imports was not counterbalanced by an export drive by domestic producers. To some extent this reflects the conservatism and provincialism of the domestic industry. Its history of family firms and small town ties makes it ill prepared to compete in foreign markets. Yet exporting has never been a primary focus of competition because the United States is the world's largest market for apparel. First of all, the trade data clearly indicate the presence of underlying differences in trade behavior among developed and developing countries. Not surprisingly, as Table 4–6 documents, the developed nations engage in intraindustry trade, which is the trade outcome of specialization in production, while the developing nations export into industrial markets with little exchange, clearly an import-substitution strategy. So while it is true that Western Europe did and does offer some marketing opportunities for domestic producers, generally the developing countries have not. Until very recently, apparel has been exclusively an export

Table 4–6. Clothing Exports by Main Areas, 1980 (in billions of dollars).

	Destination		
Origin	*Developed Countries*	*Developing Countries*	*Eastern Bloc*
Developed	$15.7	$2.1	$0.4
Developing	13.8	2.8	0.5
Eastern Bloc	2.0	0.7	2.3

Source: General Agreement on Tariffs and Trade (1984: Table 2.11).

industry in the industrializing and less developed countries. Low per capita income and the absence of Western habits of consumption yielded few market opportunities there.

In competing for the European market, domestic manufacturers have been limited by their lesser fashion sense than that of European producers. Once again, this difference reflects less an inherent inability to compete than the substantial differences between U.S. and European market structures. It appears that the average European consumer is much more fashion sensitive than the average U.S. consumer. In Europe the apparel market is substantially segmented by class, while in the United States all classes tend to favor the same styles (Sable 1982). As a result, U.S. apparel producers are unused to manufacturing for highly fashion sensitive markets and disadvantaged in exporting into them.

ESTIMATING EMPLOYMENT LOSS DUE TO TRADE

In the postwar period, apparel imports have continually increased and apparel employment in all industrialized countries has steadily declined. These two facts are clear. The dispute centers on the connection between these two phenomena. The growth in imports may be linked to the decline in employment in apparel through (1) accounting studies that partition job loss into the proportion of employment change attributable to changes in demand, increases in productivity, and changes in the level of imports; (2) counterfactual analysis that asks what employment would have been in the absence of imports; (3) input-output analyses that trace direct and indirect job loss; and (4) estimates of apparel employment in other countries.

Accounting models are conventionally used to disaggregate changes in employment between two points in time into changes in domestic demand, exports, imports, and productivity growth. Accounting studies on the employment-displacing effect of trade in apparel during the 1960s and 1970s concluded that changes in productivity per employee were considerably more important in reducing employment in the industry than were the effects of trade. Charles Frank of the Brookings Institution studied the effects of trade on employment in nineteen industries and found that during the period 1963–1971, apparel was one of only four job-losing sectors in the United States. According to Frank, imports accounted for only 0.8 percent of the decline in employment in each year, although exports were so sluggish that they had no positive effect on employment. During this period, domestic demand for clothing, which increased at only half the rate of growth of total demand for all manufactured output, was a stronger determinant of domestic employment than trade. Overall, Frank found that 55,000 jobs were lost in the apparel industry as a result of increased import penetration; for all manufacturers, the total loss was 354,000 (see Table 4–7). This led Frank (1977: 37) to conclude that "job losses due to trade are insignificant compared to those due to increased productivity or fluctuations in aggregate demand." Domestic demand swamped the effect of foreign trade as a determinant of employment levels, a finding that is consistent with the relatively small trade deficit in apparel until the end of the period.

Frank's calculations, which were made at a highly aggregated level, may well have concealed intraindustry employment differences. The apparel industry comprises a large number of products, and it is not at all clear that every segment was losing international competitiveness in comparison with developing country producers. The results of a study by Anne Krueger (1979) reveal that at the four-digit SIC level, there was, in fact, wide variation in performance across industry segments. In men's and boys' shirts and work clothing, for example, employment expanded. In the work clothing and children's clothing segments, strong domestic demand growth substantially counterbalanced the negative affect of productivity and imports (see Table 4–8).

Other studies based on roughly the same method support the general conclusion that productivity growth appears to have had a negative effect on employment that was nearly three times greater than the effect of net import penetration (de la Torre et al. 1984). When applied to Western Europe, for example, the accounting method yields fundamentally the same results as it does for the United States. For 1962–1975, a study by Frank Wolter of the Institut fur Weltwirtschaft at the University

Table 4–7. Sources of Growth of Employment In Selected Import-competing Industries, United States, 1963–1971 (percent per annum).

	Growth Rate		*Contributions to Growth of Employment*					
SIC Industry Class	*Total Employment*[a] *(1)*	*Production Man-hours*[b] *(2)*	*Productivity per Employee (3)*	*Productivity per Man-hour (4)*	*Domestic Demand (5)*	*Exports (6)*	*Imports (7)*	*Trade*[c] *(8)*
22. Textiles	−7.5	−7.7	−9.5	−9.7	2.2	0.1	−0.2	−0.1
23. Apparel	−3.6	−4.8	−6.2	−7.4	3.4	0.0	−0.8	−0.8

Source: Frank (1977: 29).

[a]Alegbraic sum of columns 3, 5, 6 and 7; numbers have been rounded.

[b]Algebraic sum of columns 4, 5, 6 and 7; numbers have been rounded.

[c]Algebraic sum of columns 6 and 7; numbers have been rounded.

Table 4–8. Sources of Labor Displacement in the U.S. Apparel Industry, 1970–1976.

SIC[a]	*Segment*[b]	*Demand Growth*	*Labor Productivity*	*Imports*	*Employment*
2311	MB suits and coats	−0.85%	−1.73%	−1.21%	−3.79%
2321	MB shirts	5.06	−2.55	−2.38	0.15
2327	MB pants	0.35	−2.76	0.65	−1.76
2328	MB work clothing	6.32	−1.47	−1.45	3.41
2341	WC underwear	0.23	−3.05	−0.03	−2.84
2342	Corsets and allied garments	−0.30	−7.20	−1.33	−8.84
2369	Children's clothing	8.30	−5.08	−4.37	−1.15

Source: International Labor Organization (1980b).

[a]Standard Industrial Classification.

[b]MB = men's and boys'. WC = women's and children's.

of Kiel shows that displacement due to productivity growth amounts to 463,400 jobs in textiles and 160,000 in clothing, while the corresponding effect of growth in imports was apparent in a job displacement of 141,800 and 144,600, respectively, of which only 24,200 (17 percent) and 45,900 (32 percent) were caused by imports from developing countries (Keesing and Wolf 1980: 36–37). De la Torre's (1984) study of job changes between 1970 and 1980 for eight countries, including the United States and Japan, conforms with other studies of this type: on average, productivity increases in the eight countries had a negative effect on employment that was nearly three times greater than the effect of increases in net trade penetration.

Four points tend to mitigate the view, inherent in the accounting model approach, that trade has had only an insignificant effect on employment. First, it is unlikely that import penetration and productivity growth are independent occurrences. Because the notion of independence among imports, exports, domestic demand, and productivity improvements is built into accounting models, these models tend to yield fairly credible employment numbers and fairly incredible explanations of job loss. Accounting models miss the several ways in which imports spark productivity improvements. To begin with, as imports expand, the weakest firms will go bankrupt first, leading to an immediate jump in productivity. Then, import pressure will most likely accelerate the search for methods of dealing with the industry's main weakness, its labor intensity. Second, accounting models do not consider the job losses that occur upstream in textile and fiber production. Third, the exceptionally slow growth of retail and wholesale prices of apparel in the United States over the last two decades suggests that the pressure of imports may have eroded profit margins by forcing competitive price-cutting (Council of Economic Advisors 1987).[3] Finally, these studies were conducted before the import surge of the 1980s. A similar event in Western Europe in the 1970s saw an enormous amount of job loss and community disruption, the same effects that are now occurring in the United States as imports continue to grow.

Another way of linking imports and job loss is to look at employment per unit of domestic output and then ask what employment would have been in the absence of imports. Using counterfactual analysis, a World Bank study (Balassa 1979) estimated job loss by assuming that all OECD countries used American labor input coefficients to produce their exports and replace imports in their trade with developing countries. This led to the result that the combined trade balance with these

countries in 1976 would have implied a net loss of 230,700 jobs in apparel and textiles together in all OECD countries, including 115,600 in the United States and 95,900 in the EC countries (Balassa 1979).

Keesing and Wolf addressed the same problem. Their study began with a set of much more complicated assumptions but reached essentially the same conclusion as the World Bank study. For apparel, their model indicates that if there had been no trade with developing countries, there would have been about 125,000 additional jobs in the American apparel industry in 1978, compared with the estimated 1978 employment level of 1.24 million, an increase of 10 percent (Keesing and Wolf 1980: 115).

At the heart of counterfactual analysis is the assumption of the stability of unit labor requirements, a questionable assumption given productivity improvements in the industry. Analyses that assume constant labor coefficients tend, over time, to overestimate job loss due to trade. While accounting models miss the short-run labor displacing effects of trade, counterfactual analyses miss the longer run productivity effect that reduces unit labor requirements.

Input-output (I-O) analysis deals with interindustry transactions generated by the demand for final products. An I-O model permits one to understand the structural interdependencies that exist across the economy. Using this method an analyst can show the total expansion (or contraction) in output (or employment) in all industries as a result of the change in output in the final processing sector (Bendavid 1974: chap. 7; Miernyk 1965: chap. 3). I-O analysis traces the direct and indirect effects of a change in final demand. The direct effect is the labor in the industry needed to produce the industry's own output, while indirect effect is the labor in all other industries needed to produce the final processing sector's output.

A 1981 I-O model by Economic Consulting Services analyzed the fiber, textile, and apparel industries as an interrelated production complex, a set of industries that are linked together by a large volume of interindustry sales and purchases. According to this model, $30.5 billion in final demand for apparel in the domestic economy created 463,009 jobs outside of the complex (in other manufacturing sectors, finance, services, and distribution) and 1,449,245 jobs in sectors closely tied to apparel (mainly fiber and textile production) (Economic Consulting Services 1981). Thus for every additional $1 million in final demand for apparel, the economy generated approximately 450 jobs within the complex and 150 jobs in other manufacturing and service sectors. By

inference, imports in 1984 of −$11,391.1 million had an employment price of approximately 500,000 jobs in apparel and textiles and 170,000 jobs in other manufacturing and service sectors.

Keesing and Wolf (1983) estimated the indirect job loss in textiles that was caused by apparel imports. From their analysis it appears that, omitting shipments within the apparel sector, purchases from the textiles industries were equivalent to 29 percent of the value of the apparel sold. Using I-O counterfactually, Keesing and Wolf argue that if apparel imports from developing countries had not taken place, the net employment-creation effect might have been a 3–4 percent increase in textile employment, or 29,000 additional jobs. The implication of their analysis (1980: 115–116) is that one job is lost indirectly in textiles for every four or five jobs lost directly in apparel. To portray comprehensively the true employment effect of imports, of course, the indirect employment effect must be summed over all sectors in the economy. This suggests that the loss of apparel production from domestic locations threatens jobs in other parts of the economy that are indirectly linked to domestic apparel manufacture. The important strategic point is that jobs lost in apparel because of bankruptcies or offshore production may not have the same employment effect as jobs lost because of, for instance, intensive automation. In the first instance, both direct employment and indirect employment would be lost. In the second instance, automation, which would undoubtedly displace thousands of apparel workers, would at the same time preserve linked jobs by keeping the production of apparel, and therefore the demand for ancillary goods and services, in the United States.

I-O analysis has also been used to construct "job opportunities" models. This analytic strategy is based on estimating the number of domestic jobs that would have been required to produce the same dollar value of imports. Using a 367-sector I-O model, Aho and Orr (1981) estimated that between 1964 and 1975 trade reduced employment opportunities in apparel by 103,000, a decline of 87,000 job opportunities in apparel and 16,000 in supplier industries. Moreover, the industries most adversely affected by trade employed "more women and minorities and their work forces were less skilled than industries that benefited most from trade. In addition, workers in the adversely affected industries had lower earnings and were more likely to have a family income below the poverty level than those in trade enhanced industries" (Aho and Orr 1981: 34).

Using a seventy-nine-sector I-O model, the U.S. International Trade Commission (1986b) estimated the labor content of merchandise trade for the years between 1978 and 1984. In this analysis the labor content of U.S. imports (that is, the labor required to produce all intermediate inputs in the traded good) is assumed to be the labor inputs that would be required to make the same dollar amount of the domestic substitute. Labor content thus estimates the change in domestic labor demand, or the change in job opportunities, associated with imports. Over the period, the ITC study estimated that trade reduced job opportunities in the apparel industry by 225,800 work-years.

While apparel was consistently one of the industries with the largest total labor content of imports over the last two decades, the job opportunity studies probably understate the loss of job opportunities in apparel. If imports are priced much lower than domestic output,[4] then estimates of the domestic labor requirements needed to produce an equivalent dollar amount of imports will significantly understate the labor content of imports. The International Ladies' Garment Workers' Union research department has developed a technique to convert import prices of apparel into prices for comparable output produced in the United States (International Ladies' Garment Workers' Union 1985).[5] Based on this adjustment, the labor content of imports would be approximately double the one presented by the ITC (U.S. International Trade Commission 1986b: 118).

A final way to measure the employment lost in the United States is to look at the employment gained in developing countries that have substantial apparel industries. Obviously, this is a crude indicator, but it does illustrate the magnitudes involved and the shifting geography of apparel employment. The International Labour Organization (1980b: 27) comments that:

> While employment has been declining in the industrialized countries, it has taken a sharp leap upwards in certain countries where the manufacture of clothing for export has increased in recent years. In Singapore, the number of workers employed in the clothing industry more than doubled between 1970 and 1978, rising from 12,698 to 32, 792 workers. Employment indices in the industry were 185.3 for Hong Kong (1970 = 100) and 153.3 for the Republic of Korea in 1976.

Obviously, the most significant limitation in using this type of data is that productivity differences affect the rate at which workers in developing

countries can directly replace apparel workers in developed countries. And because estimates of comparative productivity differ enormously, it is difficult to use this indirect method to estimate the domestic employment effect of imports. On the one hand, the International Labour Organization (1980b) reports that production per worker in various less developed countries varied from 80 percent of the European rate in Hong Kong or Morocco to more than 100 percent of the U.S. rate in Mexico and South Korea. On the other hand, the AAMA, the industry's trade group, argues that "while U.S. wage rates are often five times [or twelve times] the rates paid in LDC's, U.S. productivity is normally 35% to 100% greater" (American Apparel Manufacturers Association 1984: 30).

While one might justifiably be skeptical of trade association data, the unreliability of productivity estimates, whatever the source, make any assessment difficult. The U.S. Bureau of Labor Statistics considers its own productivity figures on the domestic apparel industry so unreliable that it does not publish them. Because of the internationalization of production there is always a great risk of double counting output. In the United States the partial assembly of garments offshore means that some output is probably double counted, first as an import under USTU 807 and USTU 807A, and then again as domestic output (Brand 1987).[6] Even style changes can change productivity measures; short skirts, for instance, have shorter seams than long ones, and thus reduce sewing time per garment. Similarly, untailored and loosely structured clothing also require less labor per garment (Mankoff 1987). The organization of the labor process, the structure of the payment system, the nature of the labor force (for example, the use of children's labor), and the degree of coercion exercised in the workplace all affect productivity measures. Cross-national comparisons founder on each of these issues. In regard to productivity estimates, skepticism is justified.

In summary, analysts generally agree that trade has reduced domestic employment in the apparel industry. If one assumes—somewhat artificially—that trade and productivity growth are unrelated, then the effect of trade on employment has been less important than productivity growth as a cause of job loss. With those conservative assumptions, imports reduced employment by 1 to 2 percent annually from the mid-1960s through the mid-1970s. Conclusions based on I-O analysis define a much broader range of employment effects, ranging from a low estimate of 100,000 to a high of 500,000 from the mid-1970s to the mid-1980s, a period of intense import penetration.

The Costs of Job Loss

After assessing the magnitude of job loss that is attributable to trade, the question becomes what happens to those who lose their jobs? The Canadian Department of Industry, Trade and Commerce's Labour Force Tracking Project (1980) studied this issue by looking at the initial duration of a spell of unemployment of displaced workers. Clothing and textile workers represented 47 percent of the sample of 9,626 workers who were displaced. Among the clothing workers, 25 percent left the labor force following separation from their jobs. Initial periods of unemployment for laid-off apparel workers were longer for women than for men, and the mean period of initial unemployment was twenty-one weeks for male workers and thirty-one weeks for female workers.

The U.S. data on wage change, while not broken down by industry, indicated that 53 percent of the men and 60 percent of the women earned less after the first job change than they had before it (Corson et al. 1979). Table 4–9 reports the U.S. Department of Labor estimates of the value of net earnings losses over three years resulting from job loss in the apparel industry. The estimates distinguish between those workers who were permanently separated from their jobs and those who were recalled from a layoff. This report implies that income loss, after taking government assistance into account, was relatively small, amounting to $5,600 over three years. It is important to recognize, however, that this estimate applied a 3 percent real discount rate to apparel workers' earnings.

Table 4–9. Mean Discounted Present Value of Earnings Losses of U.S. Apparel Workers.

	Never Recalled by Employer	*Recalled by Employer*	*Total*
Earnings losses	10,800	2,100	4,400
Benefits			
Unemployment insurance	2,900	800	1,400
Trade adjustment assistance	2,300	900	1,300
Net Loss	5,600	400	1,800

Source: Corson et al. (1979).

Trade and the Unions

Particularly in the last decade, international trade in apparel has eroded the domestic employment base. The affect of trade on the apparel unions is less clear. The erosion of union membership predates the industry's import problems. Between 1973 and 1985 membership in the International Ladies' Garment Workers' Union (ILGWU)—the prime organizers of workers in the women's and children's apparel industry—fell by 51.2 percent, twice as quickly as total apparel employment. Moreover, the rate of unionization in the women's and children's apparel segment of the industry dropped by almost 20 percent, far outstripping the contraction in the national slump in unionization (Silvia 1987: 17). It is important to recognize, though, that the membership base of the Amalgamated Clothing and Textile Workers Union (ACTWU) and the ILGWU began to shrink largely in response to the shifting geography of industry employment.[7] It is also important to note that, while not altering this basic trend toward less organization of the apparel work force, imports have contributed to the declining strength of the unions.

One attempt to model the factors influencing ILGWU membership concluded that imports alone account for a statistically significant share of the decline in membership (Kahn 1986). Kahn specified two models to explain the decline in membership in the ILGWU. The first specification of the model was essentially a political model. It posited that the change in ILGWU membership was a function of the change in consumer prices, changes in unemployment rates in manufacturing, and the strength of the Democratic Party in the U.S. House of Representatives. The alternative model was an explicitly economic one. It explained change in membership as a function of imports as a proportion of industry value-added, the substitutability of capital for labor, and the ratio of labor costs to total costs. For those who imagine that unions have a lasting and effective connection with the Democratic Party, it may be surprising to learn that the political model had very little explanatory power. The economic specification, on the other hand, was quite convincing. Indeed, Kahn concluded that "if *only* imports are included in the regression, 25 percent of the variance in the change in union membership is explained" (Kahn 1986: 283).

Imports damaged the unions by intensifying competition between domestic union and nonunion firms. Accelerated competition for shrinking domestic markets took several forms, all of which undermined unionization rates and the unions' efforts to organize new shops. Nonunion shops

were able, for example, to cut the piece rate and reduce production costs, while union firms could not because they were bound by collective bargaining agreements that fixed the rate for the life of the contract. Higher cost union firms, less able than their nonunion competitors to cut production costs quickly, were the first to go out of business. And in a domestic political climate hostile to unions, employers that adopted militant union-busting approaches threw up an almost impenetrable wall to union organizing efforts (Starobin 1986). Overall, the surge of imports into the domestic market added one more factor to an already unfavorable set of circumstances confronting the apparel unions.

MANAGED TRADE IN APPAREL

National policy has sought to control the growth of textile and apparel imports for the last two hundred years. Beginning with the Tariff Act of 1816, which justified protection on the basis of protecting an infant industry from import-created market disruption, negotiated trade in fibers, textiles, and clothing has been standard practice. And since the Tariff Act of 1930, tariffs on textiles and apparel have remained higher than those on other manufactured goods. The tariff wall surrounding these sectors arose from the economic and political importance of textiles and apparel in the United States and the industries' greater import sensitivity as compared with more capital-intensive industries. Yet high tariffs, estimated to be 20 percent on average (OECD 1983), have failed to stave off domestic job loss and declining market share.

In 1961 and 1962 two multilateral agreements were negotiated: the Short-Term Agreement (STA) and its successor, the Long-Term Agreement (LTA). The LTA remained in effect for five years and was renegotiated to extend through 1973. While the LTA was in effect, imports of cotton textiles products grew rapidly, from 310 million pounds in 1962 to 564 million pounds in 1973. U.S. production during the same period fell from 4.2 to 3.7 billion pounds, and the overall import penetration level reached 15 percent by 1972 (Nehmer and Love 1985).

The most recent attempt to deal with growing imports, although not with the proliferation of producers and products, is the Multifiber Agreement (MFA). The MFA has been in effect since 1974, and covers textiles and apparel made of cotton, wool, manmade fibers, and, since August 1, 1986, other vegetable fibers such as linen, ramie, and silk blends. At that time the MFA was extended, for a third time, for five years

through July 1991. The MFA's purpose is to allow signatories to negotiate bilateral agreements between themselves and other countries to regulate trade in textiles and apparel. The twenty-five bilateral agreements currently in force impose some restraints on American imports.

In addition to bilateral limits, the MFA authorizes unilateral action against imports that disrupt or threaten to disrupt the domestic market. Article 3 specifies that the minimum restraint level may be set only at the level of actual imports or exports during the calendar year ending two months prior to the request for consultation. Moreover, in almost all cases import surges must have occurred *before* consultations take place. Thus, the MFA will not (and most likely, cannot) limit imports. Rather, it tries to manage the growth of trade in textiles and apparel. It provides for a minimum annual growth rate of 6 percent for the specific products covered by bilateral agreements. The U.S. market, however, has been growing well below this minimum for some years. This indicates that imports captured a rising share of the domestic market, even when they stayed within the MFA growth limits. The import problem had two additional dimensions, neither of which was explicitly acknowledged by the existing trade regime: the number of supplying countries was increasing, and the number and value of products were growing.

The structure of the MFA presented foreign producers whose imports approached the bilateral limits with incentives to circumvent the limits or, more threateningly, to move out of controlled into uncontrolled product categories, which frequently contained higher value and more fashion-sensitive products. The People's Republic of China exemplifies the first incentive. When China approached its quota on wool sweaters, its producers hired subcontractors in Hong Kong, a country that had not yet filled its wool sweater quota, to assemble pieces of wool sweaters that were knit at home. Although the United States filed a complaint, it was heard by the enforcement body established by the MFA only after the sweaters were imported.

The second incentive is more threatening to U.S. producers and workers in the long run. It results from the use of quotas instead of tariffs as the implementation mechanism in the MFA. Quotas measure import penetration by quantity—poundage or thousands of dozens of articles of clothing. By not controlling the value of imports, as a tariff would, the MFA implicitly encourages producers to move into higher value products per unit of controlled quantity. The changing composition

of imports under the MFA regime is consistent with this interpretation. Between 1962 and 1978 the value of apparel imports increased by 121 percent, from sixty-three cents to $1.72 per square yard equivalent (SYE). The increase in the wholesale price index for the same period was only 105 percent (Arpan et al. 1982: 64). This trend accelerated under the MFA: between 1970 and 1977 the SYE value of apparel increased by 114 percent, while the wholesale price index increased by only 76 percent (Arpan et al. 1982: 64). Factoring in the exchange rate effect shows that some of the escalation in the price per SYE may have resulted from import prices increasing relative to domestic prices, especially at the end of the period. Nevertheless, it is clear that the major reason for the increased value per unit of quantity is that, since the early 1970s, foreign suppliers have shifted from textiles toward higher value apparel. Indeed, ". . . apparel accounted for 41 percent of the total 1970 poundage of U.S. cotton, wool and man-made products covered under bilateral agreements fiber imports and 42 percent in 1974. This ratio then rose to approximately 62 percent by 1982" (Nehmer and Love 1985: 245).

Of course, the domestic textile industry is not free of import disruptions. On the contrary, the reduction of market share for domestic apparel producers directly reduces demand for domestic fiber and yarn. As Nehmer and Love (1985: 246) point out, "the decline of U.S. textile production, as measured by U.S. textile mill consumption of fibers, from 11.1 billion pounds in 1974 to 10.1 billion pounds in 1982, roughly matches the rise of total textile apparel imports from 0.9 billion pounds to 1.7 billion pounds during the same period."

The MFA, then, has not substantially slowed import penetration or market disruption in apparel. From 1982 to 1985 imports of MFA regulated products increased by 62 percent. Unregulated products also proliferated. Foreign producers began to use new fiber blends that were unregulated (linen, ramie, and silk, for instance) or fabrics that blend regulated fibers (cotton and wool, for example) with unregulated fibers to keep the proportion of regulated fiber in the garments below the MFA limit. Garments that are 49 percent cotton, for example, are exempt from the MFA, while garments that are 50 percent cotton are subject to regulation. While the most recent round of MFA negotiations brought some unregulated blends under the purview of the MFA, the general problem continues and the incentive to shift production into unregulated categories persists.

The effectiveness of the MFA hinges on how governments negotiate and enforce their rights and obligations under bilateral agreements. A

significant quantity of U.S. imports is subject to restraints imposed by bilateral agreements. In 1982, for example, 72 percent of all American textile and apparel imports were covered by bilateral agreements (Nehmer and Love 1985: 243). Yet these controls regulate only the most import-sensitive products, a relatively small number of product lines (Nehmer and Love 1985: 261).

CORPORATE STRATEGIES

Despite the pervasiveness of managed trade, the future of the domestic apparel industry hinges on two decisions: the political one about protection and the economic one about automation. One outcome is clear for labor: employment will continue to decline. Indeed the crucial employment question concerns the thousands of related jobs that exist because there is apparel production in the United States. For the industry as a whole, three outcomes are possible: continuing protection, continuing erosion of apparel and its linked employment because of the quiet abandonment of apparel manufacturing by domestic firms, or a substantial breakthrough in automation that will reduce direct employment in apparel but sustain related employment in the United States.

Continuing Protection

The high rate of job loss in the apparel industry during a period of intense protection leads to the simple conclusion that the abolition of managed trade would result in an enormous loss of jobs in the United States—a conclusion that unifies free trade advocates and protectionists. Keesing and Wolf (1980: 154) of the Trade Policy Research Centre estimate that the job loss in the U.S. apparel industry under free trade would reach 570,000 jobs by 1990. And as I argued earlier, protection in the form of bilateral agreements does not guarantee employment stability; it only slows the rate of job loss. It is conceivable, of course, that a stronger and more effective system of trade management could be developed. For now, however, this is unlikely because of the Reagan administration's hostility toward congressional legislation that would limit the share of the market available to imports. But even in a more hospitable political climate, countervailing interests will counteract the

effectiveness of protection, thus assuring the slow erosion of domestic employment and production in apparel. Support for free trade will come from a variety of sources. Retailers and importers will demand free trade in the interest of the higher profits imports provide because of their higher retail markup (Parsons 1987a). Developing countries will oppose protection in the interest of securing desperately needed foreign exchange and of forwarding their economic development strategies. Export-oriented U.S. firms, principally the suppliers of military hardware and advanced technology, will support open markets in apparel as the necessary quid pro quo for access to foreign markets. And finally, the strategic interests of the United States will militate against wholly effective protection (Gilpin 1987): the importance of China to U.S. economic and military interests is one example of the conflict between the protection of a domestic industry and the perceived international interests of the United States.

The Continuing Erosion of Employment

A more likley scenario is the continuation of some manner of rather leaky protection, accompanied by a series of corporate decisions by domestic apparel firms that will result in the erosion of domestic employment in apparel and, as important, the loss of jobs in other sectors that exist because apparel is produced in the United States. The decisions U.S. firms are now making fall into two related categories: (1) whether to compete on the basis of cost by moving production abroad, through either subcontracting or using wholly or partially owned Item 807 plants or (2) whether to abandon competition as apparel manufacturers in favor of competing as designers, distributors, and merchandisers of apparel, much of which is made outside the United States.

Off-shoring Production. Needless to say, domestic firms that choose to engage in price competition with low-wage producers must seek out low-cost, high-productivity locations. Table 4–10 shows the nominal labor cost differential among LDC producers as compared with the United States—a differential that ranges from 5 percent of U.S. wages in China to 32 percent in Hong Kong. As argued above, one should be skeptical of productivity estimates. Here it is sufficient to note that all analysts agree that the wage gap persists even when adjustments are made. Company data cited by de la Torre et al. (see Table 4–11) show

Table 4–10. Apparel Industry Wage Rates in Selected Countries.

	1975			1982		
	Hourly Wage	Wage and Fringe	Index	Hourly Wage	Wage and Fringe	Index
United States	3.20	4.00	100	5.20	6.50	100
Far East						
Hong Kong	0.80	0.55	24	1.80	2.05	32
Taiwan	0.50	0.60	15	1.50	1.75	27
Korea	0.35	0.45	11	1.00	1.25	19
Singapore	0.45	0.65	16	0.90	1.35	21
Philippines	0.20	0.25	6	0.40	0.50	8
China	0.12	0.15	4	0.20	0.30	5
Latin America						
Jamaica	—	—	—	0.75	0.95	15
Costa Rica	0.30	0.40	10	0.60	0.80	12
Haiti	0.15	0.20	5	0.30	0.40	6
Other countries						
Portugal	0.95	1.20	30	1.20	1.50	23
Egypt	0.20	0.35	9	0.40	0.55	8

Source: U.S. Department of Labor.

Table 4–11. Effective Labor Costs in the Apparel Industry, 1978.

	Wage and Benefits ($/hr.)	Productivity Rating (U.S. = 100)	Effective Labor Costs ($/hr)	Effective Labor Costs (U.S. = 100)
United States	4.50	100	4.50	100
West Germany	5.50	95	5.79	129
Japan	3.75	70	5.36	119
Hong Kong	1.10	90	1.22	27
Taiwan	0.77	80	0.96	21
Singapore	0.80	70	1.14	25
South Korea	0.60	80	0.75	17
Dominican Republic	0.60	60	1.00	22

Source: de la Torre et al. (1984: 71).

productivity-adjusted wage differences in the range of 20 to 25 percent of U.S. wages. The competitive problem this wage gap presents becomes clear upon examining the effect of nominal labor costs on total production costs. Table 4–12 breaks down the cost components as a proportion of the total cost of production by alternative production locations. According to this table, the "best" U.S. production methods could compete with offshore production. "Best," however, is difficult to define since both variable costs (material and labor) and fixed costs (overhead and so on) decline. Indeed, it appears that the anticipated cost savings come from shifting some share of production costs onto workers in the form of lower wages and onto material suppliers in the form of lower prices. Nonetheless, when compared to typical U.S. production costs, offshoring offers a cost advantage of 4.7 to 7.2 percent. Table 4–13 details production costs for two kinds of men's sports shirts manufactured in different locations. Asian production sites yielded a landed cost advantage of 6 to 29 percent, depending on the product.

Public policy reinforces the economies of offshore production. Item 807 of the Tariff Schedule of the United States provides an incentive for domestic firms to produce offshore. Under Item 807 imported goods that are assembled in foreign countries from U.S.-manufactured

Table 4–12. Cost Comparison of Men's Woven Polyester/Cotton Dress Shirts.

	Production Location			
Cost Component	U.S. Typical (%)	U.S. Best (%)	807 Caribbean	Far East
Material	48.6	46.3	48.4	39.3
Labor (cut, sew, finish, excesses, indirect labor, and fringes)	40.3	35.0	18.5	12.1
Factory overhead, other costs, and contractor margins (duty, freight, insurance, brokerage fees, profit)	11.1	10.2	8.1	3.3
	—	—	20.3	35.4
Total	100.0	91.4	95.3	92.8

Source: American Apparel Manufacturers Association (1984).

Table 4-13. Price Estimates for Fancy Sport Shirts, 1983.

	Made in Own Plant	U.S. Contractor	807 Contractor	Korean Contractor	Sri Lankan Contractor	Taiwanese Contractor
Woven, 65% Polyester/35% Cotton, Yard-dyed, Long Sleeve, Two Pockets						
Fabric	na	2.38	—	1.94	2.07	1.88
Labor and overhead	na	5.46	—	1.62	1.77	2.21
Total F.O.B.	6.92	7.84	—	3.56	3.84	4.09
Duty: 27 1/2% + $.19/lb.			0.00	1.06	1.12	1.19
Other importing costs			0.00	0.32	0.49	0.42
Total importing costs			0.00	1.38	1.61	1.61
Landed $ cost per unit	6.92	7.84	6.27	4.34	5.45	5.70
% of own price	100	113	91	71	79	82
100% Cotton, Yard-dyed, Long Sleeve, Two Pockets						
Fabric	3.00	3.00	na	2.58	2.52	1.96
Labor and overhead	3.25	5.24	na	1.83	1.93	1.00
Total F.O.B.	6.25	8.24	na	4.41	4.45	2.96
Duty: 21%				0.93	0.93	0.62
Other importing costs				0.41	0.49	0.15
Total importing costs				1.34	1.42	0.78
Landed $ cost per unit	6.25	8.24	6.59	5.75	5.87	3.74
% of own price	100	132	105	92	94	50

Source: American Apparel Manufacturers Association (1984: Table V-5).
na = not available.

components are subject to duty only on the value of the imported product less the value of the U.S.-fabricated components. Only the value that is added to the U.S. components is dutiable when the product is reimported into the United States (U.S. International Trade Commission 1986a: 1–1). Under Item 807, U.S. apparel firms can export fabric for sewing, hemming, stitching, or any other operation that does not change the form of the exported component.

Imports of most textiles and apparel under Item 807 are subject to quantitative restraints under the MFA. Duty-free treatment and quotas have both been liberalized, however, under the Caribbean Basin Economic Recovery Act, commonly referred to as the Caribbean Basin Initiative (CBI), implemented January 1, 1984. When the CBI program was originally announced, President Reagan had stated his intention to provide more liberal quota treatment for CBI textile and apparel imports. On February 20, 1986, he announced a new "special access program" to liberalize quota treatment on imports on apparel and made-up textiles such as bed linens. The program is designed to provide CBI countries with greater access to the U.S. market for their products entered under Item 807 that have been assembled with fabric that has been produced and cut in the United States. The twenty-two CBI countries have been invited to conclude bilateral agreements with the United States that will permit guaranteed levels of access for their qualifying apparel and textile products. These levels will be separate from the quotas applicable to textile and apparel products not assembled completely with textiles made and cut in the United States.

The use of Item 807 increased steadily during the 1960s and reached a plateau of 8 to 10 percent of total U.S. apparel imports in the late 1970s as the growth Item 807 imports fell below the rate of growth for all imports (International Labour Organization 1980b: 15) (see Table 4–14). Between 1982 and 1985 imports of textiles, apparel, and footwear under Item 807 increased by 80 percent, to $1.17 billion, although in the aggregate, Item 807 continued to represent a small proportion of total imports. Nonetheless, Item 807 is significant in terms of employment, accounting for 95 percent of the labor content of production that is exported and reimported. This is because sewing operations, the most labor-intensive part of apparel production, are sent abroad (Starobin 1986).

Between 1982 and 1985 one-half of the growth of Item 807 apparel imports was generated by the two largest suppliers, Mexico and the Dominican Republic. Imports from Mexico rose by 82 percent and those

Table 4–14. U.S. Imports of Apparel under Item 807: Market Value in Foreign Countries ($ millions).

Period	Total Imports	Item 807.00 Value	807 Imports as Percent of Total Imports
1965	578.2	1.7	0.3
1966	628.1	6.4	1.0
1967	687.5	12.2	1.8
1968	863.0	24.0	2.8
1969	1,079.1	40.5	3.8
1970	1,247.7	50.4	4.0
1971	1,502.5	69.3	4.6
1972	1,859.4	95.0	5.1
1973	2,118.5	141.0	6.7
1974	2,313.6	238.3	10.3
1975	2,630.6	253.3	9.6
1976	3,635.6	292.5	7.9
1977	4,338.4	327.9	7.6
1978	5,353.5	418.9	7.8
1979	5,469.4	476.7	8.7
1980	6,007.9	524.0	8.7
1981	7,361.3	596.3	8.1
1982	8,092.4	564.1	7.0
1983	9,547.6	638.4	6.7
1984	13,322.1	794.6	6.0
1985	14,840.4	964.3	6.5

Source: International Ladies' Garment Workers' Union (1985) and U.S. International Trade Commission (1984).

from the Dominican Republic increased by 78 percent during that period. These two countries, along with Haiti and Costa Rica, accounted for two-thirds of Item 807 imports of apparel in 1985 (see Table 4–15).[8] Even before the inception of the CBI program, the largest share of Item 807 imports came from countries in Central and South America and the Caribbean (General Agreement on Tariffs and Trade 1984: 104).

Despite the rise in Item 807 imports, they continue to represent a minor element of total imports (see Table 4–14). After peaking at 10 percent in 1974, the share of Item 807 imports declined 4 percent by 1984. And CBI, which affected the composition of Item 807 supplier

Table 4–15. Item 807 Imports of Cotton, Wool, and Man-made Fiber Textiles by Area, 1983–1986 ($ millions).

Area	1983	1984	1985	1986
CBI countries[a]	0[b]	427	551	672
Mexico	0[b]	254	280	319
Europe	0[b]	16	17	20
Hong Kong	na	31	30	23
Taiwan	na	7	8	11
Korea	na	7	14	11
All others	0	37	50	
Total	0	779	950	1,104

Source: U.S. International Trade Commission (1986a).

[a]Dominican Republic, Costa Rica, Haiti, Honduras, Belize, Guatemala, and Barbados.

[b]Less than $500.

na = not available.

countries, did not affect the share of imports under the Tariff Schedule Item. In addition, with a few exceptions, Item 807 imports account for only a small percentage of total imports across most product categories (see Table 4–16). Body-supporting garments, trousers, and shirts and blouses accounted for two-thirds of total Item 807 imports in 1985 (U.S. International Trade Commission 1986a).

Domestic manufacturers of brassieres depend upon Item 807, using factories and workers in low-wage countries (principally the Philippines, Mexico, the Dominican Republic, and Costa Rica) to assemble and, sometimes, package brassieres for retail sale. The importance of Item 807 for this industry segment has led to a round of direct foreign investment in 807 plants. In the Philippines, one of the largest 807 suppliers in this product line, the factories were developed under U.S. financing and control (U.S. International Trade Commission 1986a: 4–6). In dramatic contrast to all other apparel segments, Item 807 imports of body-supporting garments account for 70 to 80 percent of total imports. In no other industry segment do Item 807 imports constitute such a large share of total imports.

In contrast, the use of Item 807 by manufacturers of trousers, slacks, and shorts has increased twice as fast as total trouser imports between 1982 and 1985, and, because trousers contain more fabric than most apparel articles, the duty-free value of Item 807 imports increased by

Table 4-16. Ratio of 807 Imports to Total Imports for Selected Articles, 1982-1985.

Article	*1982*	*1983*	*1984*	*1985*
Body-supporting garments	83.0	79.7	74.3	77.2
Trousers, slacks, and shorts	7.3	7.3	9.2	10.8
Shirts and blouses	4.5	4.2	4.3	4.5
All apparel	7.0	6.7	6.0	6.5

Source: U.S. International Trade Commission (1986a).

percent over the same period. Yet Item 807 imports accounted for only 10.8 percent of total trouser imports in 1985. The most notable change in this category was in the source of Item 807 imports. Because of the special treatment accorded Item 807 imports assembled from U.S.-made and cut textiles, all but a small part of this increase in trouser imports under Item 807 came from the CBI countries.

Item 807 imports of shirts and blouses also surged, rising 190 percent between 1982 and 1985. But since total imports rose at the same pace, the Item 807 share of total imports remained stable. And unlike trousers, the duty-free value of shirts and blouses was only about 50 percent of the total value, compared to approximately 66 percent of all other apparel items. This difference arose from the minor use of U.S.-fabricated components in Item 807 shipments from Hong Kong, Taiwan, and South Korea, which together accounted for 25 percent of the Item 807 imports in 1985. "The shirts entered under Item 807 from the 'Big Three,' which accounted for less than 2 percent of their total shirt shipments of almost $2.3 billion in 1985, reportedly are manufactured from foreign-made and -cut materials, except for certain U.S.-produced findings such as buttons" (U.S. International Trade Commission 1986a: 4-7).

To date, firms' experiences with Item 807 have been mixed, which probably explains its limited growth. For example, Casualwear, Inc., a small women's wear producer, invested in a joint venture in Haiti in the mid-1960s. After one year it found that extremely low wages ($1 per day) could not compensate for low productivity and high turnover. The cost per Haitian unit produced and shipped to the United States was 90 percent of its American cost. Soon afterward Casualwear moved to a twin plant that straddled the Mexican-U.S. border. By sewing and assembling 20 to 30 percent of its output in Mexico, Casualwear was

able to lower its average costs while maintaining better marketing services than a foreign exporter inexperienced and uncomfortable with foreign production (Parsons 1987b). At the same time, some large apparel companies, many of which produce standard commodity products like men's dress shirts, underwear, and brassieres, have mastered the use of 807 plants. Manhattan Industries, Philips-Van Heusen, Warnaco, and Kellwood (all among the fifteen largest U.S. apparel firms) import 30 percent of their total requirements from offshore assembly or subcontracting abroad—they do not own the facility in either case, but simply supply the cut fabric and provide some technical assistance (de la Torre 1978: 95). Overall, however, it is unlikely that Item 807 will ever represent a substantial share of imports.

Abandoning Manufacturing. Subcontracting production is another strategy available to domestic firms. In reality, extensive subcontracting means that domestic apparel firms move out of the manufacturing sector and become design, marketing, and distribution companies. In women's outerwear this trend is clear. Between 1977 and 1982, women's outerwear manufacturers declined by 35 percent, while jobbers and contractors increased by 52 and 26 percent respectively (U.S. Congress 1987: 62).[9]

The corporate strategy, of which subcontracting is the manufacturing aspect, involves competing on the basis of product differentiation rather than price. Liz Claiborne, the world's largest women's apparel company, with estimated sales of nearly $220 million in 1983, is an excellent example of the merchandising strategy. The company does not manufacture any of its merchandise: it contracts out 100 percent of its designs and then markets them to the country's top department and specialty stores. By sourcing designs that comply with its fabric and quality specifications, the company does not tie up its own capital and can market its goods at competitive prices, while offering a highly diverse line. Liz Claiborne utilizes over seventy suppliers in the United States and abroad. Approximately 68 percent of the company's products are manufactured outside the United States, mainly in Hong Kong, Korea, and Taiwan (First Manhattan Co. 1983).

The combination of product identification and low-cost production locations has worked well for other apparel firms as well. One of the most dramatic stories is Puritan Fashions' agreement to launch a line of jeans under the signature of Calvin Klein with massive advertising support. Likewise, Palm Beach, an old and staid men's suit company,

began to emphasize innovation and designer products in the early 1970s. Among its early successes was acquiring the Evan Picone name for a line that targeted white-collar working women. The company's sales doubled to $230 million from 1973 to 1978, its earnings increased six-fold, and its return on equity of 25 percent was three times the industry average (de la Torre et al. 1978: 92).

For diversified firms that possess a strong brand name, a merchandising strategy is an attractive competitive strategy. The risk that a firm runs with a nonmanufacturing strategy is that it will be placed in a competitive squeeze. On one side, pressure will come from domestic retailers who are both able and willing to hire designers, to act as their own jobbers and subcontractors, and even to market clothing under store-cum-designer labels. On the other side are foreign subcontractors who can enter the design and marketing end of the business. Even more threatening is the abundant supply of easy-to-copy styles. Indeed, the very overnight success of new entrants into the apparel merchandising business—the Liz Claibornes, Esprits, and Jordaches—indicates the volatility of the market and the ease with which brand names are overthrown.

To overcome this risk and to reap the advantages of producing close to the market, there are signs that domestic firms are using undocumented female labor to construct a domestic putting out system, thus reaping the "advantage" of cheap labor while maintaining proximity to the market. In metropolitan areas with large pools of undocumented immigrant labor—Los Angeles, New York, Chicago, and San Francisco—the employment of workers at subminimum wages and without minimal protections like Social Security, unemployment insurance, and workmen's compensation is a burgeoning part of the industry. It is difficult to estimate the magnitude of this practice. The Federal Reserve Bank of Dallas (Hill and Pearce 1987) estimates that 10.5 percent of all "illegal alien employees" are employed in the apparel industry and that 39 percent of the apparel industry's work force is composed of undocumented workers, making the apparel industry one of the largest participants in what could be called the "underground labor market." In addition to the small apparel establishments there is also a growing number of homeworkers. In Chicago, for example, ten or so major dress and sportswear manufacturers subcontract to seamstresses who work at home. While this practice exists in a statistical void insofar as government employment data are concerned, estimates of homeworkers range from several hundred to several thousand in Chicago alone. In San Francisco, where apparel production employment

is very small according to the government data, one can hear the whir of sewing machines throughout Chinatown and watch non-English speaking Asian women entering and leaving buildings carrying the paraphenalia of their trade. For the women workers in the new putting out system wages approach Third World levels. One woman who works at home reported that she received "50 cents a shirt [and that] it takes a half hour to do a shirt" (Goozner 1987: 5).

The putting out system offers domestic apparel manufacturers a solution to a competitive dilemma: quick turnaround is becoming a crucial basis for competition, but, because of the labor intensity of production, labor rates remain an inescapable part of price competition. So producers must now compete on the basis of price and style: the first requires low-wage labor; the second, proximity to the market.

Automating Production

Firms that remain apparel manufacturers and also want to capture the competitive advantage of producing close to the market must face the wage disparity issue head-on. Automating production is the most obvious strategic choice, but it is a double-edged strategy that would overcome the competitive problem of labor-intensive production but also guarantee the elimination of domestic production employment in the industry. It would, however, keep production located in the United States and therefore continue to generate demand for linked goods and services and maintain labor demand in those linked sectors (Cohen and Zysman 1987).

Technical innovation in apparel is following two tracks. On one track is what one industry executive called the search for "a mechanical Puerto Rican," an offensive remark that captures in a phrase the Taylorist approach to organizing the industry's labor process. In cooler terms, the automation of apparel must reduce labor intensity while maintaining a firm's ability to shift its product mix rapidly; the machinery must be flexible. On the other track is a still inchoate effort to establish Quick Response (QR) production. In broad outline, a QR strategy calls for a shorter manufacturing cycle, lower inventories, more frequent reorders, and a faster flow of information between retailers, manufacturers, and suppliers.

The objective here is not to analyze the possibilities and limitations of the automation of production in apparel in detail.[10] It is necessary to

note, however, that the traditional industrialized production of apparel is a multistage activity (preassembly, assembly, and finishing) in which material handling constitutes 40 to 60 percent of total costs and 80 percent of the total manufacturing time (General Agreement on Tariffs and Trade 1984: 51). Aside from the automatic sewing machine, an epochal innovation that made industrialized sewing feasible, innovation has not come quickly. Indeed, the most significant innovations have affected the pre-sewing stage (the grading, marking, and cutting of fabric). Computerized grading systems, which automatically cut patterns of various sizes; automatic fabric spreaders; computerized marking machines; and several types of innovative fabric cutters have restructured pre-assembly operations in ways almost unimaginable ten years ago. Yet the result of these innovations has been double-edged. They affect a stage of the production process that accounts for less than 5 percent of total labor costs, yet at the same time, they affect the most highly skilled members of the industry's work force. These innovations have little effect on the wage gap problem, and reduce labor requirements for the industry's most skilled production workers.

Sewing and fabric handling remain the major barriers to automation and the source of the industry's labor intensity. And while labor costs do differ among producers, based on the complexity of the garment, sewing constitutes 90 percent of total labor costs (General Agreement on Tariffs and Trade 1984: 51). Automating sewing is the critical issue. Since the late 1960s a stream of incremental innovations has rationalized the sewing process, reduced the skill requirements of operators, increased sewing speeds, and enhanced the uniformity of sewing operations. But all of these innovations taken together—including the advent of numerically controlled sewing machines—has not altered the central place of sewing machine operators in the industry's occupational structure, which remained essentially unchanged between 1977 and 1983 (see Table 4–17).

CONCLUSION

Neither internationally managed trade in apparel nor a range of production and merchandising strategies is likely to halt the erosion of the domestic employment base in the apparel industry. A trade deficit of almost $18 billion in 1986 and the loss of 700,000 jobs since 1960 summarize the industry's plight: low-wage nation competitors continue

Table 4–17. Percentage Distribution of Occupational Employment in the Apparel Industry, 1977, 1980, and 1983.

	1977	*1980*	*1983*
Total Employment	1.3 mil	1.3 mil	1.1 mil
Managers and officers	3.41%	3.6%	3.11%
Professional and technical	1.12	1.40	1.53
Service	1.27	1.20	1.16
Production	83.61	83.21	83.92
Pressers, hand	3.52	3.53	1.2
Pressers, machine	1.77	1.73	2.68
Nonworking supervisor	2.17	1.96	2.70
Inspector	2.65	2.23	
Sewing machine operator, garment	47.82	47.09	49.83
All-around tailor	.25	.17	na
Patterncutter	.11	.13	.95[b]
Patternmaker	.31	.30	na
Spreader	1.09	1.02	na
Marker	.38	.35	na
Folder	1.24	1.36	na
Clerical	8.73	9.14	8.60
Shop clericals[a]	3.93	4.05	3.34
Sales	1.39	1.45	1.67

Source: U.S. Department of Labor (1980, 1982, 1985) and unpublished U.S. Bureau of Labor Statistics data.

[a]Includes production clerks and coordinators, shipping packers, shipping and receiving clerks, shade-ticket markers, and all other plant clericals.

[b]Includes patterncutters and patternmakers.

na = could not be determined because of occupational reclassification.

to capture an expanding share of the domestic market, and domestic employment continues to contract. This is a severe, and growing public policy problem because the workers who have been and will continue to be displaced are uneducated, minority women—many of them undocumented workers—who are likely to experience long spells of unemployment and have difficulty moving into growing economic sectors. And neither macroeconomic adjustment of the exchange rate nor international management through the Multifiber Arrangement appears capable of turning the situation around.

Formal economic accounts of the affect of trade on domestic employment find that in the early 1960s through the early 1970s, changes in aggregate demand and productivity growth were more important determinants of the contraction of employment than imports were. These studies are in keeping with the relatively small trade deficit over this period. Yet the persuasiveness of these studies falls short; they assume the independence of events that were surely interdependent—the growth of productivity and the growth of imports. The I-O studies are more convincing. Quite importantly, I-O includes both the direct and indirect employment effects. Moreover, I-O models note that the decline in domestic labor demand reduced "job opportunities" for disadvantaged workers even in the 1960s and early 1970s. From the 1970s to the present, the apparel industry has experienced one of the most severe contractions in job opportunities of any domestic manufacturing sector, a deficit of 220,000 to 500,000 work-years.

Presently, no strategy has been developed that will solve the industry's competitive problems. A level of protection that would reserve the domestic market for the domestic industry—either through congressional legislation or through tightening the enforcement of the MFA—seems unlikely. The use of partial offshore production by domestic producers, while successful for some industry segments, represents a small and relatively stable share of total imports. Even automation is a long shot. Larger firms are subcontracting direct manufacturing functions, while focusing on design, acquisition of materials, and distribution. As a result, production employment is growing in subcontracting establishments and in the domestic underground labor market of sweatshops and homework as it shrinks in traditional manufacturing establishments. Optimism is unwarranted. International trade in apparel has pushed the employment outlook for female, minority, poor, badly educated, and non-English speaking workers from bad to worse.

NOTES

1. For an excellent history of managed trade in apparel see Aggarwal (1985).
2. To some extent, the erosion of earnings is a direct result of the location decisions of apparel firms. In the post–World War II period, U.S. apparel manufacturers, seeking low-wage nonunion labor, shifted production from the Northeast to the Southeast and then to the West and Southwest. Wage differentials were significant. For example, a trained cutter—one of the most skilled jobs in the industry—earned between $4.36 and $5.33 an hour in 1977 in any northern state. The same worker in a southeastern or a south central state earned between $3.71 and $4.63 an hour—that is, 80 to 85 percent of the equivalent northern wage. Differences in the rate of unionization tell the same story. In 1977, the apparel industry was 90 percent unionized in the North, 33 percent in the South, and 44 percent in the West. As a consequence of the regional shift, apparel employment in the North dropped by 80 percent immediately after World War II. Even over the last decade, the difference in rates of job loss among regions is staggering, down 30 percent in the North compared with 8 percent in the South and West.
3. The consumer price index for apparel rose from 1967 = 100 to December 1986 = 210.9, compared to the index for all items, which rose from 1967 = 100 to December 1986 = 331.1. The producer price index for industrial commodities showed the same trend. Textile products and apparel rose from 1967 = 100 to December 1986 = 211.0. The index for total industrial commodities rose from 1967 = 100 to December 1986 = 309.3.
4. This claim usually applies to goods before wholesale and retail markups. Presumably, goods of the same quality sell at the same retail price.
5. The ILGWU no longer uses this method to estimate import penetration. Instead of calculating conversion factors for the value of imports, the ILGWU (1987) now calculates total consumer demand for apparel in wholesale value terms. Imports are then equal to domestic demand net of the value of shipments of domestically produced apparel.
6. Economists at the U.S. Bureau of Labor Statistics are attempting to construct a productivity measure that will overcome some of these problems. At this point, however, they are uncertain about the measure's reliability and do not know whether it will produce publishable data. In any event, the measure will only apply to men's and boys' suits and coats; the ubiquity of sweatshops and homework in the women's wear segments makes it unlikely that the Bureau will be able to develop reliable productivity measures for them (Brand 1987).
7. See note 2.
8. Some of the steepest growth in imports was from South Korea, the fifth largest supplier of Item 807 shipments, from which imports rose 386 percent during 1982–1985. Unlike all other suppliers, whose shipments consisted primarily, if not almost exclusively, of apparel, however, Korea's shipments were mostly of footwear.
9. Manufacturers perform all operations pertaining to the production of garments. Jobbers control design, acquire material, and arrange for sale but perform no manufacturing functions. Contractors receive cut materials and assemble them into finished garments.

10. For an analysis of the automation of apparel production see Parsons (1987a and 1987b) and Hoffman (1985).

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7 THE CHANGING SHAPE OF DOMESTIC EMPLOYMENT IN A HIGH-TECH INDUSTRY
The Case of International Trade in Semiconductors

Carol A. Parsons

Once an economic bright spot and an industry on which many were pinning the nation's economic hopes, the semiconductor industry is now hard hit by international competition and, like its brethren in America's older manufacturing core, it is crying foul play against its foreign rivals and asking for government aid and protection. Indeed, the industry's recent history shows troubling parallels with smokestack manufacturing—intense foreign competition, mounting trade deficits, loss of domestic employment, declining market share in critical product segments, and layoffs and plant closures. These discomforting similarities cast doubt on the usefulness of economic development strategies that are based on easy divisions between sunrise and sunset industries. They also imply that high-technology industry may not be a solution to the employment problems of traditional manufacturing.

TWO PERIODS OF FOREIGN TRADE IN SEMICONDUCTORS

This chapter examines the effect of international trade on domestic employment in the semiconductor industry. As a starting point it is useful to recognize that there have been two periods of foreign trade in the

semiconductor industry's development. In the first period—dating from the industry's genesis until the mid-1970s—direct foreign investment was the central strategic principle driving production organization, which includes the level and composition of labor demand. In the second period—from the mid-1970s to the present—foreign competition, mainly from Japanese producers, drove the domestic industry's production strategy and has shaped the domestic industry's demand for labor.

During the first period, U.S. merchant firms dominated the world industry.[1] Foreign trade during this period was the result of domestically headquartered companies that shipped partially completed circuits outside of the United States for final assembly. The impetus behind this movement of low-wage production jobs overseas was intense price competition among U.S.-owned firms. Dating from about the 1978 recession, when Japanese firms seized a large share of the U.S. market—Japanese imports rose from 7.7 percent of total U.S. imports in 1977 to 16.5 percent in 1978—trade in semiconductors literally became foreign trade. While the reimportation of domestic firms' output continued to be an important part of U.S. semiconductor imports, the composition of those imports shifted as the output of Japanese firms manufacturing in Japan claimed an expanding share of total imports.

Just a brief look at the import figures for the last fifteen years supports the validity of this characterization. From 1969 to 1978 approximately 80 percent of the value of semiconductor imports resulted from the reimportation of the output of domestically headquartered companies. These product flows are itemized under TSUS Items 806.30 and 807.00. Enacted in 1963, the Item 806/807 provisions allowed U.S. firms to export semifinished goods for final production and then reimport the goods and pay duty only on the value that was added offshore. In 1969 item 806/807 imports accounted for 95 percent of the value of all semiconductor imports (see Table 7–1). And while this percentage declined rather bumpily, falling to 70 percent or so during recession years, these duty-free imports still constituted 85 percent of the value of all imports in 1978. Beginning that year, however, and continuing steadily ever since, the share of imports taken by Item 806/807 declined. Even during the industry boom in 1984, imports exempt from tariffs fell to 3 percent, reaching an all-time low of 49 percent during the 1985 bust.

The decline of Item 806/807 marks the transition to the second stage of international trade. Over the same period that the Item 806/807 share of imports fell by 27 percent, Japanese imports grew from 7.7 percent

Table 7–1. 806.30 and 807.00 Imports as a Percentage of Total U.S. Imports and Total Shipments, 1969–1984.

Year	*806/807 Imports ($ millions)*	*Total U.S. Imports ($ millions)*	*806/807 as Percentage of Value of Total U.S. Imports*	*806/807 as Percentage of Value of U.S. Shipments*
1969	127	134	95	8.1
1970	160	168	95	10.7
1971	178	187	95	11.1
1972	254	329	77	9.4
1973	413	611	68	11.3
1974	684	953	72	15.9
1975	617	802	77	18.8
1976	879	1098	80	19.6
1977	1120	1358	82	21.0
1978	1478	1775	83	23.0
1979	1916	2427	79	23.2
1980	2506	3326	75	23.9
1981	2825	3553	80	24.1
1982	3131	4128	76	27.7
1983	3383	4881	69	25.2
1984	5000	7800	64	28.2

Source: 806/807 data from Flamm (1984: 74); value of shipments from Census (various years); approximate 1984 figures from U.S. Department of Commerce, Bureau of the U.S. Department of Commerce (1985).

of the total value of imports to 24.4 percent, an increase of 16.7 percent. This increase in Japanese imports reflects the loss of the commodity memory chip market by U.S. firms. While U.S. companies held 73 percent of the metal oxide semiconductors (MOS) memory chip market in 1980, they only held a 44 percent share by 1984. Over the same period, Japanese companies' share of the MOS segment had grown from 26 percent to 51 percent (Integrated Circuit Engineering Corporation 1986).

These data suggest that the task of determining how trade in semiconductors has affected the level and composition of domestic employment can actually be divided into two separate questions: What effect has the offshoring of employment by domestic producers had on domestic employment? And how has domestic employment been affected

by Japanese competition? The discussion that follows will indicate that during the first period, on balance, trade in semiconductors created more jobs in the United States than it destroyed. During the second period, international trade showed up as real job loss, not just lost "job opportunities," as U.S. firms lost domestic market share to the Japanese. In both periods international trade tilted the domestic occupational structure toward technical and managerial jobs while reducing domestic production employment. This increased job opportunities for educated, white male employees while reducing job slots for less educated female and minority workers.

At the same time, some Japanese semiconductor producers chose to build production facilities in the United States, with consequent employment opportunities for American workers. Thus the urgent need that Japanese manufacturers feel to maintain access to the U.S. market may provide a measure of insurance for a very small number of U.S. workers whose jobs might otherwise be threatened by continued Japanese successes (and American failures) in semiconductor trade. Quite recently, in fact, the dollar's depreciation and the growing lobby favoring protectionist legislation have begun to make the United States a desirable location for Japanese producers. Yet it is also clear that the continuing automation of semiconductor production, especially of the formerly labor-intensive assembly stage of production, will mean an increasingly weak tie between direct foreign investment and employment (Parsons 1987).

When examining trade and its domestic employment outcomes during these two periods, one should keep two caveats in mind. First, technological innovation is constantly and quickly pushing the industry into more advanced products and manufacturing processes. Quite aside from trade's affect on labor demand, these technical advances by themselves have had and continue to have a decisive impact on labor demand. As the industry shifts from one generation of product technology to another—from the earlier generation of large-scale integration (LSI) to the most advanced product technology of very large scale integration (VLSI)—companies are introducing new products and new, or vastly improved, manufacturing processes. With VLSI, which is a shorthand for changes in the manufacturing process that make it possible to place more electronic circuits on each semiconductor chip, firms are choosing among a wide range of strategic options. Firms are investigating automating previously labor-intensive segments of the production process, a step that could ultimately require the geographical

reintegration of production steps—wafer fabrication, assembly, and testing—that have traditionally been kept geographically separate. Constant incremental (and sometimes radical) innovations in products and their manufacturing processes have had, in short, an enormous effect on the industry's pattern of labor demand. For the purposes of this chapter, technology will be treated as an exogenous variable. But it would be misleading to overlook the central role of technical innovation in the changing occupational structure and geographical distribution of employment.

The other warning flag is the role and importance of state industrial policies. Because of the strategic importance of the semiconductor industry, and the constant technical innovation that is a requirement for market success, the role of government-led industrial development policy has played a crucial role in shaping the industry's growth and production strategy (Borrus, Millstein, and Zysman 1980). Industrial policies link together, for purposes of this analysis, technical change on the one hand and the structure of production on the other.

Profile of International Trade in Semiconductors

Trade in semiconductors has accelerated rapidly over the last fifteen years. In the decade between 1972 and 1982, total imports grew at an annual average rate of 23.9 percent. Exports during the same period increased each year by only 13.4 percent on average (U.S. Department of Commerce 1986). Throughout the 1970s the U.S. trade balance in semiconductors remained comfortably in surplus. Beginning in 1981, however, the trade balance in semiconductors slipped into deficit and in six years slid from a $156 million surplus in 1980 to a $1.2 billion deficit in 1986 (see Table 7–2).

To a large extent, trade levels reflect variations in the demand for final products for which semiconductors are used. This variation in end-users leads to an uneven demand for semiconductors. The 1984 boom market in semiconductors, which was driven by the growth in computer sales and orders by computer producers to replenish their flagging inventories, exemplifies the underlying cause of volatile demand conditions in the industry. During the 1984 boom, imports soared by 55 percent. In 1985, when computer sales slumped, semiconductor sales took a nose dive and imports plummeted by 30.5 percent. With a slight lag, then, the

Table 7-2. U.S. Imports and Exports of Semiconductors (in $ thousands).[a]

Year	Imports	Exports	Balance
1972	$ 330,000	$ 470,000	$ 140,000
1973	619,000	849,000	224,000
1974	961,000	1,248,000	287,000
1975	803,000	1,054,000	251,000
1976	1,107,000	1,400,000	293,000
1977	1,352,000	1,503,000	151,000
1978	1,765,000	1,933,000	168,000
1979	2,447,000	2,609,000	162,000
1980	3,291,000	3,447,000	156,000
1981	3,665,000	3,579,000	-86,000
1982	4,215,000	3,787,000	-428,000
1983	5,038,000	4,352,000	-687,000
1984	7,754,000	5,313,000	-1,568,000
1985	5,788,000	4,219,000	-1,568,000
1986	6,079,000	4,847,000	-1,232,000

[a]SIC 3674.

Sources: U.S. Department of Commerce (1986); unpublished U.S. Department of Commerce data.

demand for semiconductors mirrors the demand for the final products for which semiconductors are used.

The reason the 1985 slump was felt so keenly in the U.S. market was due, in large part, to the differences in the relative specialization of the end-users in different national markets. Overall, the world market fell by 16 percent between 1984 and 1985; in the United States, demand tumbled twice as far, down by 30 percent. In Japan and Europe, demand declined quite moderately, by 2 percent and 4 percent, respectively. This difference in performance hinges on the differences in the end-user markets: the U.S. industry sells almost one-third of its semiconductor output to the computer sector, compared to 10.4 percent for Japanese producers and a 20 percent share for Western European producers (United Nations Centre on Transnational Corporations 1986).

Variations in the structure of demand are a central determinant of the changing pattern of trade. A fuller explanation, however, hinges on an exposition of the two distinct stages of international trade in semiconductors and the competitive conditions each period represents.

Domestically Created Foreign Trade—Stage One

The internationalization of trade in semiconductors initially resulted from direct foreign investment by U.S. companies, which shifted labor-intensive assembly operations to low-wage countries in Latin America and the Far East. The batch manufacturing process made it practical to keep chip design, requiring skilled engineers, and wafer fabrication, requiring expensive equipment and controlled handling, in the United States while taking chip assembly offshore. This international division of labor was at the heart of foreign trade in semiconductors. Between 1964 and 1972 chips assembled offshore by U.S. companies accounted for 95 percent of semiconductor imports.

During the first decade of the industry's development, the technical characteristics of production and the cost advantage of offshore assembly created a self-reinforcing logic. By moving labor-intensive assembly work to low-wage countries, U.S.-headquartered companies reduced total production costs and simultaneously brought competitive pressure to bear on their competitors to offshore their own assembly operations in order to keep their costs competitive. The cost advantage of cheap labor seems indisputable. Industry analyst William Finan (1975) estimated that the lower wages in assembly plants in the Far East and Latin America could reduce *total* manufacturing costs by 50 percent. "For example," he wrote, "the total manufacturing cost of an MOS integrated circuit in 1973 was approximately $1.45 per device with assembly done in Singapore. If the *same device* was assembled in the U.S., the total manufacturing cost would be about $3.00" (Finan 1975: 23). This cost advantage produced a wave of direct foreign investment. Beginning when Fairchild opened a semiconductor plant in Hong Kong in 1964 (no doubt partially in response to the Item 806/807 tariff provisions that were enacted in 1963), U.S. semiconductor firms quickly constructed plants and hired workers. There were twenty-three plants in 1971; there were eighty-two in 1979 (see Table 7-3). And while the industry employed 50,000 workers outside the United States in 1971, this number had reached 89,000 by 1978 (see Table 7-4). While offshore employment continued to be significant throughout the late 1970s and on into the 1980s, up-to-date and reliable estimates of world employment outside the United States are scarce. Recent estimates tend to overlook employment by subcontractors and therefore tend to understate the level of offshore employment. And as multinational companies

Table 7-3. The Development of Offshore Investment in Various Third World Locations by Major U.S., Japanese, and Western European Semiconductor Firms, 1971–1979.

	Number of Firms Present[a]				
Country	*1971*	*1974*	*1976*	*1979*	*1982*
Korea	6	8	8	8	8
Hong Kong	1	6	6	7	6
Indonesia	0	3	3	3	3
Malaysia	0–2	11–13	13–14	14	14
Philippines	0	0	1	6	10
Singapore	9	10	12	13	11
Taiwan	3	3	6	1	7
Thailand	—	—	1	1	1
Brazil	0–2	2	5	5	[b]
Mexico	—	—	12	13	[b]
Barbados	0	0	0	1	1
Puerto Rico	—	—	2	3	[b]
El Salvador	—	1	1	2	1
Morocco	—	—	1	1	1
Malta	—	—	1	1	2
Portugal	—	—	2–3	3	2

[a]The sample included twenty-four U.S. firms, six European firms, and seven Japanese firms. Each firm was counted once, even if it had more than one plant in each country. The U.S. companies were AMD, Burroughs, Fairchild, General Electric, General Instrument, Harris, Hewlett Packard, Intel, International Rectifier, Intersil, ITT, Litonix, Mauman, Monsanto, Mostek, Motorola, National Semiconductor, Pulse Engineering, Raytheon, RCA, Rockwell, Texas Instruments, and Zilog.

[b]Figures for 1982 are from the update in the United Nations Centre for Transnational Corporations (1986).

Source: United Nations Industrial Development Organization (1981: 240).

from Japan and Europe adopted offshore assembly as part of their production strategy it became more difficult to establish the ownership of foreign plants—an increasingly difficult problem as transnational joint ventures and other strategic alliances proliferate. After wrestling with problems of this type, the United Nations Centre on Transnational Corporations (1986) estimated that in 1980, employment outside of the United States in U.S.-owned semiconductor firms was between 115,000 and 130,000, with one estimate going as high as 200,000.

Estimating the Effect of Offshore Employment on the Domestic Work Force. What effect, if any, did this wave of DFI have on the level and

Table 7-4. World Employment in the U.S. Semiconductor Industry, 1966–1978.

Year	*United States*	*Abroad*[a]	*Total*
1966	82,000	4,000	86,000
1967	85,000	10,000	95,000
1968	87,000	20,000	107,000
1969	99,000	40,000	139,000
1970	88,000	45,000	133,000
1971	75,000	50,000	125,000
1972	98,000	60,000	158,000
1973	120,000	80,000	200,000
1974	133,000	85,000	218,000
1978	131,000	89,000	220,000

[a]Until 1974, the majority of foreign employees were located in Third World locations. In 1974, for example, only 5,000 of 85,000 foreign workers were employed in Western Europe or Japan.

Sources: For 1966–1974, U.S. Department of Commerce (1979); for 1978, U.S. International Trade Commission (1980: 6).

composition of U.S. employment in the semiconductor industry? Counterfactual analysis, that is, asking what domestic employment would have been if there had been no offshore production, is one way of gauging the employment effect of DFI. When applied to the 1964–1978 period, counterfactual analysis has one notable strength and one weakness. On the positive side, counterfactual analysis conforms to the fact that until approximately 1977, employment by U.S.-owned firms and worldwide employment in the semiconductor industry were virtually one and the same thing. This means that during the period when U.S. firms dominated the industry, it is reasonable to identify total employment outside of the United States as the maximum estimate of forgone domestic employment due to offshore production. When U.S. firms were effectively responsible for all DFI in semiconductors, counterfactual analysis offers a credible estimate of the maximum number of domestic jobs forgone. If the labor content of offshore assembly were the same as domestic assembly, a largely accurate assumption, especially from the early 1960s through the mid-1970s, then the maximum forgone employment amounted to between 150,000 (U.S. Congress, Office of Technology Assessment 1983) to 185,000 jobs (Flamm 1985). This estimate is reasonable on its surface because assembly was very labor-intensive, whether it was done in the United States or overseas.

The problem with this estimate, and the weakness of counterfactual analysis, lies in its implicit assumption that domestic production at higher wage rates would not have reduced the demand for semiconductors and, therefore, the demand for labor. Of course, the degree to which employment would decline with a rise in production costs and price is an empirical question, with the magnitude of the effect depending on how sensitive buyers are to price changes.[2]

Estimating Price Elasticity. Kenneth Flamm (1985) of the Brookings Institution estimated the employment effect of offshore assembly on U.S. employment, based on an analysis of changes in employment over a range of price elasticities (see Table 7–5). Flamm separated jobs lost and jobs gained into assembly jobs and nonassembly jobs, an imperfect indicator of low-wage and high-wage jobs, and then asked how the composition as well as the level of employment would have changed with different price elasticities.[3] According to his estimates, if demand were relatively price elastic, then a maximum of 4,000 jobs would have been lost in 1977. If, on the other hand, demand were fairly insensitive to price changes, there would have been a net gain of 32,000 jobs.

Table 7–5. Elasticity Estimates and Their Employment Effects in the Semiconductor Industry, 1977 (in thousands of jobs).

Estimated Demand Elasticity	*Cost Advantage Assembly Offshore*	*Net Gain, Assembly Jobs*	*Net Loss, Nonassembly Jobs*	*Net Gain, All Jobs*
−1.5	0.07	57	9	48
	0.10	53	13	40
	0.13	48	17	32
−2.3	0.07	52	14	38
	0.10	45	20	25
	0.13	38	26	13
−3.0	0.07	47	18	29
	0.10	38	26	13
	0.13	30	33	−4

Note: Flamm assumes that 70 percent of assembly is done abroad and that labor, given U.S. factor prices, is used in fixed proportion to output. Figures are rounded.

Source: Flamm (1985: Table 3-23).

The range of effects that Flamm identifies covers a lot of ground—from 30,000 to 57,000 assembly jobs gained and from 9,000 to 33,000 nonassembly jobs lost. When confronted with this range, one may ask which of these estimates is the most likely? To answer that question, we need to know what the likely price elasticity of demand is.

Finan and Amundsen (1986), in a study done for the U.S. Trade Representative, estimated the demand elasticity for the U.S. semiconductor market at −1.8. Baldwin and Krugman (1986) found this estimate convincing when they compared it with the change in price and quantity from 1978 to 1981—the period when 16K dRAMs were the commodity memory. "It is apparent," they argue, "that the elasticity of demand for semiconductor memories must be more than one but not much more, given that the price per bit has fallen 99 percent in real terms over the past decade. If demand were inelastic, the industry would have shrunk away; if it were very elastic, we would be having chips with everything by now."

Combining this elasticity and Finan's high-side estimate of the cost advantage of offshore assembly, we would argue that Flamm's −1.5 price elasticity estimate and the estimated .13 percent cost advantage from offshore assembly is the most likely estimate of the range that he calculated. If we are correct, then domestic assembly would have yielded a net gain of 32,000 jobs: 48,000 assembly jobs gained and 17,000 nonassembly jobs lost.

With a price elasticity of −1.5, 2.8 assembly jobs would be gained for every nonassembly job lost. But what does this job trade-off imply concretely for the quality of the industry's domestic jobs? The jobs gained through domestic assembly most likely would have been, on balance, less skilled and lower paid than the jobs lost. It is not possible to say that every job lost would be a $20 an hour engineer and every job gained would be a minimum wage assembly job. The industry's total domestic wage bill only would decline if the average wage of a job lost were 2.8 times higher than the average wage of a job gained. The average hourly wage in semiconductors was $8.61 in 1983 (U.S. Department of Labor 1985), while assembly wages were quite a bit lower, ranging from $5.22 to $8.82 per hour (see Table 7–6). Unfortunately, these data are not sufficient to answer the question. We need to know the distribution of industry employment by wage level—from data that are not available.

Job Opportunity Studies. Aggregate studies of job opportunities—measured as the direct labor content per dollar of industry output—are

Table 7–6. Hourly Wages for Electronics Production Workers in California's Silicon Valley, July 1984.[a]

Category	Average	Minimum	Maximum	12-month Change
Assembler 1	$5.22	$4.80	$ 6.72	+1.0%
Assembler 2	6.58	5.55	7.85	−1.0
Assembler 3	7.65	6.38	9.12	+3.5
Assembler 4	8.82	7.25	10.46	+4.6%

[a]Sample based on 100+ companies.

Source: Hauser (1984: 10).

another way of estimating the effect of trade on domestic employment. Aggregate studies of foreign trade in semiconductors during the 1960s and 1970s demonstrate that the employment effects of trade were positive; trade was a net job generator for the United States. Since most input-output models do not estimate job opportunity effects at the four-digit SIC level, the estimates of job opportunities cover a sector that is broader than semiconductors, but the findings are congruent with the U.S. industry's competitive success in a growing world market. The job opportunity studies that cover the period indicate that demand swamped the job-destroying characteristics of semiconductor production. Not only did trade create employment, but trade generated domestic employment at a quickening pace as commercial markets for semiconductor devices expanded. In electronic components and accessories, a broader industrial category that includes semiconductors, trade created 6,987 job opportunities between 1964 and 1972; by 1972 the industry was growing so quickly that by 1974 trade had created an additional 5,388 job slots (National Commission for Manpower Policy 1978: 275). Over this early period, export growth and the growth of the world market, and the dominant position of U.S. firms within it, produced employment growth.

Aho and Orr (1981), also relied on a job opportunities model and estimated net trade-related job opportunities between 1964 and 1975. Defining job opportunities as the number of jobs required to produce a dollar value of output in the U.S. industry, they identified semiconductors as one of the twenty industries that were most favorably affected by trade between 1964 and 1975. While there were 5,000 net trade-related job opportunities in 1964, by 1975 job opportunities had more than doubled: net trade-related job opportunities grew by 6,200

between 1964 and 1975. This pattern mirrors the growth in exports and sales that grew from $4 million in 1962 to $1.2 billion in 1974 (Borrus, Millstein and Zysman 1980).

Foreign Trade and Domestic Demand. During this early period of the industry's development, trade played a relatively minor role. While DFI was a crucial element of the organization of production, sales and therefore domestic employment, were driven by domestic demand. Using an accounting framework, Lawrence (1984) estimated the role of manufacturing trade flows in aggregate U.S. manufacturing employment between 1970 and 1980 and 1973 to 1980. Based on the fifty-two-category input-output model, he found that between 1970 and 1980 value added in electrical components and accessories increased by 212.5 percent. Of that change, −6.2 percent was due to foreign trade (including both the direct and indirect effects), a change that was more than counterbalanced by the 218.6 percent increase in value added due to domestic use. Between 1973 and 1980 the trends were the same: Value added grew by 109.7 percent; the −3.4 percent from foreign trade was swamped by the 113.1 percent growth in domestic use.

According to Lawrence, the effects of trade on employment followed predictably from these conclusions. Between 1973 and 1980 total sectoral employment increased by 35 percent, with trade pulling 4 percent to the bad and the domestic effect pulling 39 percent to the good. Between 1970 and 1980 employment in electronic components increased by 51 percent: −7.8 percent due to trade and 59 percent due to domestic demand. Over the longer haul the trends held steady. Lawrence summarizes three conditions that propelled domestic job growth during the first phase of the industry's growth. The industry was, first of all, comprised of U.S.-owned firms, the U.S. market was at the same time the world's fastest growing market, and the end-users were largely government buyers (primarily the U.S. Defense Depatment and NASA). The total effect of these three factors was a fast-growing domestic market that was, even with DFI, a net job creator.

Direct Foreign Investment and Occupational Restructuring. While the burgeoning market for semiconductor devices kept the demand for labor bouyant, DFI was changing the composition of domestic employment. Shifts from direct to indirect labor apparently mirror industry reorganization in response to recession, which is characterized by domestic producers cutting back higher cost U.S. assembly operations. In early 1981,

for example, manufacturers who cut back on production reported little or no effect on their foreign assembly operations (Flamm 1985: n. 126; Russell 1981; "Layoff Set by Texas Instruments" 1981). And to round out this pattern of cyclical rationalization, when demand rebounded, reduced U.S. assembly capacity was typically replaced by new or expanded assembly plants that were located offshore. Existing information on foreign employment, though sketchy, supports the view that offshore employment expanded most rapidly just after each major recession in the United States. There was a sharp increase in the proportion of semiconductor devices that were manufactured offshore following the mid-1970s recession and the attendent Japanese drive into the commodity chip market in the United States. In relation to DFI, U.S. firms pursued a double-edged strategy: rationalization in the United States during the downswing followed by expansion offshore during the upswing.

The commitment of the domestic industry to a global division of labor directly influenced the occupational composition of semiconductor employment in the United States. It is clear that production employment has been harder hit than nonproduction employment during each recession. Production employment registered a 36 percent drop between 1974 and 1975, from 81,600 to 52,400 (see Table 7–7). And while production employment has rebounded in absolute terms after each recession, the ratio of production to nonproduction employees has shifted markedly after each downturn. The ratio of production workers to all employees dropped from 64 percent to 54 percent between 1974 and 1975 and again from 54 percent to 48 percent between 1980 and 1982.

To some extent, of course, the declining ratio of semiconductor production workers is in tune with the broader occupational shift from direct to indirect labor that has been occurring in most of manufacturing since the end of World War II. Technical change and rationalization, changes that are on the whole unrelated to trade, are the principle cause of this shift in the structure of jobs. In the semiconductor industry firms' decision to move production work offshore has most likely accelerated the pace of the occupational shift but has not been its only cause. In fact, both rationalization and offshore production stem from the same cause—the desire to reduce direct labor costs.

Interpreting the Occupational Shift. The meaning of the occupational shift can be read in two different ways. Read one way, the export of low-level production work was a clear swap of jobs for wages. In dollars and cents the international division of labor meant that while industry employment was fairly evenly divided, with about half in the United States and half outside of the United States, overwhelmingly the industry's wages and salaries were paid to U.S. workers. In 1983, for instance, 47 percent of the U.S. merchant semiconductor manufacturers' work force of 270,000 was employed in the United States. Yet because two-thirds of production or assembly employment was located offshore, 82 percent of the industry's wages and salaries were paid to the domestic work force (Finan and Amundsen 1986). Earlier data on the international distribution of wages are not available, but it seems prudent to assume that the relative magnitudes were similar. The domestic industry engaged in the classical price/quantity trade-off: employing fewer domestic workers but employing them at a higher wage.

The alternative way to read the same fact is to note that trade has had the ironic effect of pitting the jobs of female workers in the United States against the jobs of female workers in the Second and Third worlds. While women made up one-third of total U.S. employment in manufacturing in 1983, they accounted for almost half of employment in

Table 7–7. Domestic Employment in the U.S. Semiconductor Industry, 1971–1985 (in thousands of workers).

Year	Total	Production
1971	74.7	45.5
1972	97.6	58.4
1973	120.0	74.7
1974	133.1	81.6
1975	96.7	52.4
1976	102.5	57.9
1977	114.0	63.5
1978	130.8	73.6
1979	142.9	81.1
1980	160.7	87.3
1981	169.5	84.9
1982	167.0	81.3
1983	169.0	84.1
1984	195.0	96.0
1985	188.0	90.0
1986	184.0	75.7

Sources: U.S. Department of Commerce (1982, 1985, 1986).

semiconductors.[4] While nationally the total electronic component work force was 51 percent male and 49 percent female, operatives—mostly assemblers and wafer fabrication assistants—were only 26 percent male and 74 percent female. Put the other way around, the Equal Employment Opportunity Commission reported that in California's Silicon Valley, the home base of the semiconductor industry, men made up 55 percent of the total work force that was engaged in component production but only 27 percent of the operatives. In the only detailed study of its occupational structure, done in 1977 by the Bureau of Labor Statistics, women held 90 percent of assembly jobs, 88 percent of inspector and tester slots, and 73 percent of processing operative jobs. So while it is true that net job opportunities and total employment grew during this first period of the semiconductor industry's development, it is also clear that offshore production that was accompanied by technical change and rationalization reshuffled job opportunities—away from women, many of them minority women, and toward white men.

Foreign Production Locations—Stage Two

As we have seen, the first stage of competition—competition among U.S. producers—generated an international division of labor that continues as the dominant production model for U.S. merchant producers. In the second stage of competition, however, there was a decided shift in the terms and character of international competition. Instead of competing against one another, as had been true for over a decade, U.S. firms found themselves competing against Japanese firms that had established themselves as the low-cost world producers. This period of the industry's development dates from 1974 to 1978, when Japanese firms' share of the world market for semiconductors increased substantially, making inroads into markets that were previously held by U.S. producers. According to the USITC, "Much of the increase in Japanese market share was gained at the expense of U.S. producers." Whether the competitive success of Japanese manufacturers was the result of low wages, low-cost manufacturing processes, or dumping, the initial effect of their success was to accelerate the prevailing trend among U.S. producers toward offshore assembly and testing.[5]

Reflecting the sunk costs of existing overseas production facilities and a commitment to low-wage labor as an effective and efficient way to organize production, U.S. firms indicated an enduring attachment to

offshore production. In fact, U.S. firms became even more committed to offshore production and an international division of labor in the period of Japanese competition than they had been earlier. In 1981, for example, between 70 percent and 80 percent of all U.S.-based semiconductor shipments were finished in assembly plants located overseas, primarily in Mexico and Southeast Asia (Flamm 1985: 81–85). Since IBM and AT&T, which assemble their domestic output in the United States, accounted for about 28 percent of all U.S. shipments of integrated circuits in 1981 (U.S. International Trade Commission 1982: 2), between 85 percent and 95 percent of all semiconductor devices that were shipped by merchant firms (that is, firms that produce integrated circuits for sale rather than for internal consumption, such as AT&T and IBM) were assembled offshore (Flamm 1985; Linebade 1985; U.S. International Trade Commission 1982). U.S. firms' first response to the Japanese cost advantage was to continue to economize on labor costs. Yet with this competitive strategy firmly in place, Japanese imports still soared. The Japanese share of total U.S. imports of semiconductors grew from 6 percent in 1977 to 11 percent in 1981 to over 25 percent in 1985.

The Domestic Employment Consequences of Trade with Japan. The effect of Japanese firms' competitive success on U.S. employment is considerably less bright than the aggregate studies reported earlier. There have been several input-output studies of the employment effects of trade in the semiconductor industry since the late 1970s, the period that we have designated the second stage in international trade in semiconductors. Following on Leontief's work, the International Trade Commission's (1986b) study of the effects of trade on employment between 1978 and 1984 is based on an estimate of the labor content of U.S. merchandise trade. The ITC study's assessment of the labor content of imports and exports of electronic components and accessories (input-output sector 57) is measured in thousands of work-years. While the sector's net labor content has been in deficit since 1978, when it posted a modest deficit of 19,000 work-years, the deficit doubled to minus 40,000 work-years in 1983, and then more than doubled again in 1984 to minus 97,000 work-years. Overall, then, between 1980 and 1984 the labor content of exports minus the labor content of imports moved the sector toward deficit by 890,000 work-years, 13 percent of the industry's 1984 employment. During this period trade reduced gross industry employment opportunities by 89,000 jobs.

The biggest problem with this approach is that the value of imports is assumed to have the same labor content as an equal value of domestic output. This assumption is problematic, especially when applied to sectors in which technical advance is central to the organization of the production process, as is the case in semiconductor production. First of all, some imports do not have a close domestic substitute. Many industry analysts argue in this vein that semiconductors that are produced by Japanese firms are a higher quality product than are U.S. firms' chips. If this is so, then the validity of the substitutability assumption is questionable. But much more importantly for the semiconductor industry, the equivalence that is assumed between the price and quantity of labor that is needed to produce some value in different production locations seems farfetched. The method obviously does not capture differences between U.S. and offshore production in the unit price of labor inputs. In assessing the employment effects of trade, therefore, this method indicates the quantity of trade-related employment generated or forgone, assuming, however, that labor that is paid, say, $20 an hour, is exactly equivalent to labor that is paid $4 an hour or fifty cents an hour.

The 480 INFORM input-output model that was developed by Interindustry Economic Research (Davis 1986) at the University of Maryland describes the total domestic input-output requirements for domestic merchandise for each year included in the model. The employment estimates are only for export-related job opportunities, which are measured as full-time equivalent employment. This measure is defined as export-related output multiplied by a labor productivity measure, which is in turn defined as the ratio of full-time equivalent jobs per unit of output. For electronics components, a category that is broader (and includes lower productivity sectors) than the semiconductor industry alone, there were 8,800 job opportunities created for each $1 billion of direct exports in 1984.[6] For solid-state semiconducting devices, total export-related employment measured as full-time equivalents fluctuated from a low of 64,000 in 1980 to a high of 75,000 in 1983, before dropping back to 70,000 in 1984 (Davis 1986).

The loss of job opportunities in the industry's domestic labor market coincides with the erosion of U.S. firms' share of the market in high-volume commodity chips. These new competitive conditions meant that the industry's continuing reliance on offshore assembly and testing affected the domestic work force differently in this period of slow market growth and slipping market shares than it had in the earlier high-growth period. First, total employment began to decline (see Table 7–7). And second, the industry abandoned its commitment to a no-layoff policy.

According to Aho and Orr (1981), industries that were net job opportunity losers during the 1960s and early 1970s were import sectors with work forces that were disproportionately female, minority, very low income, and decidedly less educated than workers in sectors that gained from trade. And although the microchip business was clearly a net export sector and job generator during that early period, these characteristics, absent the low-income characterization since the average production wage in semiconductors was essentially the average manufacturing wage, are also good descriptors of the semiconductor industry's production work force. And as the sector moved deeply into the red in the early 1980s, the jobs of these workers were clearly at risk.

Japanese Competitive Success and Domestic Employment

Nonetheless, simply the fact that Japanese imports grew, even as dramatically as they did, is not enough, in and of itself, to demonstrate that foreign trade reduced domestic job opportunties. Fieleke (1985) notes that between 1980 and 1984, across a range of industries, overall changes in sectoral employment have not been correlated with the degree of net import competition. Instead, job decline is, he argues, the result of either industrywide overcapacity or the loss of market share. It is possible for a firm to increase output and employment and lose market share in a growing market. During the second wave of internationalization, these two factors, summarized by a growing trade deficit in semiconductors, strongly point to job destruction resulting from trade.

Japanese Competition in Standard Products. To a large extent the story of job loss in this industry begins with takeoff of Japanese imports, particularly the Japanese domination of the market for memory chips. Most of the U.S. trade deficit has occurred in memory chips, where Japanese shipments to the United States nearly doubled in 1983 to more than $400 million. And even though total imports dropped by 30.5 percent in 1985, the U.S. industry continued to lose its market in commodity memory chips, the MOS memory segment of the market. The segment of the memory market that was held by U.S. companies fell from 73 percent in 1980 to 44 percent in 1984. Over the same period Japanese companies' share of the MOS memory segment grew from 26 percent in 1980 to 51 percent in 1984 (Integrated Circuit Engineering Corporation 1986). The share of the total U.S. chip market that was held by

Japanese imports increased from 7.7 percent in 1978 to 24.4 percent in 1985. Beginning with the 16K generation of dynamic random access memories (dRAMs) in 1976, and moving, by 1980, into the 64K generation, the Japanese have captured ever increasing shares of the dRAM market, holding 40 percent of the U.S. and world market for 16K chips in 1980 and 65 percent of the world market for 64K memories in 1983. Moreover, even during the 1985 slump, Japanese companies cut back their production less severely than did other foreign producers and cut their prices considerably less.

Japanese Imports and the Overvalued Dollar. The argument has been advanced that the surge in Japanese semiconductor imports and the loss of market share—especially in commodity memory chips—was primarily a consequence of the overvalued dollar. In order to test how important exchange rate changes were, one would need to do an econometric test of the exchange rate effect on the real volume and price of imports. Such a test would permit us to disentangle the effects of exchange rate changes, the alleged dumping by Japanese manufacturers of chips in the U.S. market, and technical change. Unhappily, the data to perform this test are not available. Data on the real volume of imports, firm level production costs data, and data on costs by product type are not available. Moreover, because one would expect changes in import levels to vary substantially as exchange rates vary for such price-sensitive products as commodity memories, one also would need data that were disaggregated by product type. Again, no such data series exists.

Because an econometric test was not possible, the best way of gauging the direction and magnitude of the domestic employment effect of foreign trade in semiconductors—determinining how the appreciation of the dollar affected import levels—was out of reach. As a second-best approximation, there are indirect indicators of the effect of exchange rates on semiconductor imports. These admittedly imprecise tools suggest that the exchange rate effect was relatively minor. According to the International Monetary Fund average exchange rate index (1980 = 100), the yen depreciated by 11.6 percent against the dollar in 1982, while semiconductor imports increased at triple that pace, shooting up by 35.4 percent, a rate that is much faster than the price elasticity of −1.5 implies.[7]

Over the next three years, even as the yen appreciated modestly against the dollar, imports remained stubbornly unresponsive. In 1982 and 1983 imports continued to increase. In 1982 imports of semiconductors from

Japan increased by 35.4 percent, though the average exchange rate index fell by 13.4 points, from 100.6 in the fourth quarter of 1981 to 87.2 in the fourth quarter of 1982. Imports were up by 37.1 percent in 1983 as the index climbed to 96.4 points; when imports surged by 52.7 percent in 1984, the index fell to 91.8. Over this period, the pace of growth of imports from Japan outstripped the dollar's rise by four-and-one-half times in 1982 and by twenty-two times in 1984. Even more telling is the fact that while the index records that the yen appreciated by 50.3 percent against the dollar between July 1985 and July 1986, the value of Japanese imports will, if the rate of growth of imports in the first half of 1986 holds, only fall at one-fifth that rate, declining by a modest 10.8 percent. The pattern of currency values, when juxtaposed to the growth in imports from Japan, implies that Japanese semiconductor imports are relatively insensitive to fluctuations in the value of the dollar.

Economic theory predicts that there is a lag between a currency depreciation and changes in the level of imports. Figure 7–1 suggests, however, that, even allowing for substantial lags, there has been very little correlation in the behavior of the yen/dollar exchange rate and the rate of change in imports.

Accusations of Dumping. Over the last several years, American merchant firms have filed a series of complaints with the USITC alleging that Japanese firms have dumped chips on the U.S. market. It is difficult to substantiate this claim with the price series information that is publicly available from the USITC (June 1985a, b; 1986a, c). The publicly available USITC price series, which are the weighted averages of company level production cost data, do not document a clear and convincing series of underselling. But according to analysts with the USITC and the U.S. Trade Representative's office, confidential company-level cost data supported the dumping charge.

While not disputing the finding of dumping, we would also point out that the export price, in yen, of Japanese semiconductors was falling rapidly in third markets and in Japan. Between 1980 and the first quarter of 1986, the export price of Japanese semiconductors fell more rapidly than the yen/dollar exchange rate over the same period. Using indices of the average yen/dollar exchange rate and an index of Japanese and U.S. export prices for semiconductors and integrated circuits, the semiconductor price index declined more than the IMF index in every quarter between 1981 and 1986. With 1980 as the baseline case for both

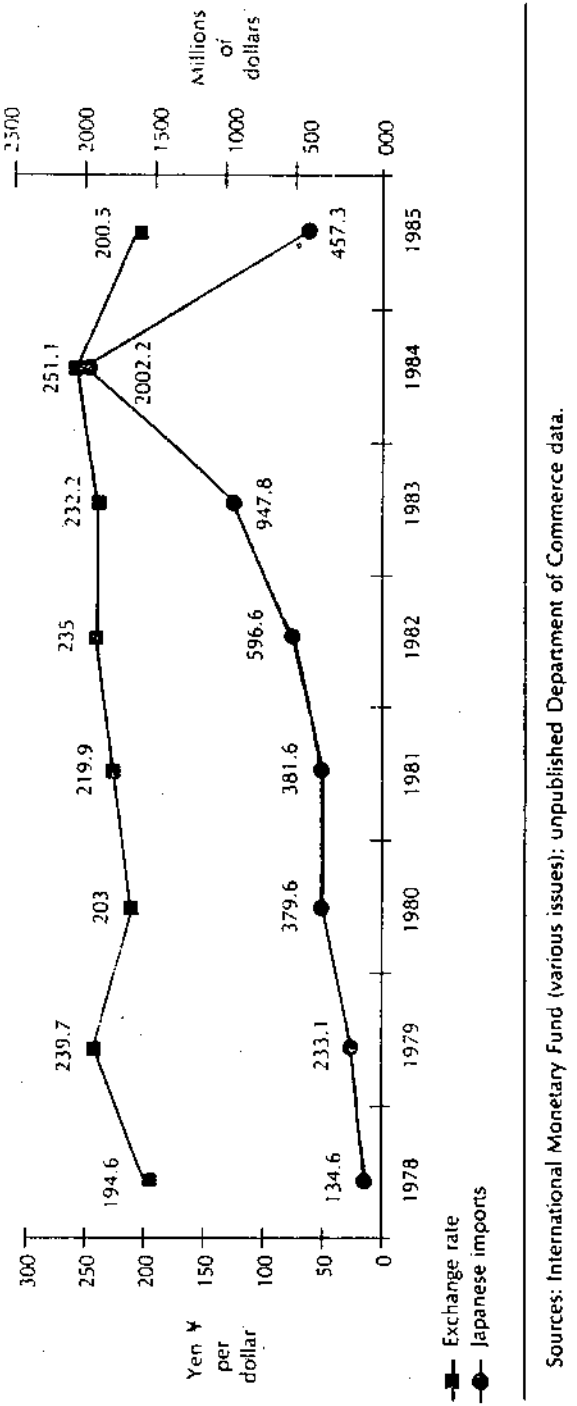

Figure 7-1. Yen per Dollar Exchange Rate and Semiconductor Imports from Japan, 1978–1985.

Sources: International Monetary Fund (various issues); unpublished Department of Commerce data.

indices, the gap between the average exchange rate and the commodity exchange rate widened. This implies that the yen price of semiconductors—the price that has exchange rate effects stripped out—was falling. To some extent (which we cannot precisely quantify), the decline in the export price of Japanese chips was unrelated to the depreciation of the yen. It is quite likely, we think, that the fall in the yen price of exports, and the growth in market share for Japanese producers, reflects technical advances in the Japanese semiconductor manufacturing process.

In sum, then, there are two distinct periods in international trade in semiconductors. In the first period, trade was domestically generated by U.S.-headquartered firms that engaged in DFI, principally in a few countries in the Far East. In the latter period, trade became more truly international. The central fact of this period was the increasing market dominance of Japanese-headquartered semiconductor producers.

ALTERNATIVE FUTURES FOR THE INDUSTRY

One possible scenario for the industry's development is that Japanese domination of the commodity memory chip market and the potential for government trade sanctions will accelerate the move toward DFI in the United States. Yet because automated production processes appear to be central to manufacturing successfully VSLI chips, Japanese state-of-the-art production facilities, even those that are located in the United States for the manufacture of random-access memories, should not be expected to create significant employment opportunities for semiconductor fabrication and assembly workers. The NEC plant in Roseville, California, for example, one of the most automated semiconductor plants in the world, is equipped with the latest generation of semiconductor production equipment—for wafer fabrication, assembly, and test—and will have a throughput of 75,000 to 80,000 wafers per month when it is fully operational (Parsons 1987). The combination of high levels of automation and the manufacture of the latest generation of semiconductor products makes the NEC plant an excellent exemplar of the potential employment effects that are associated with the decision to automate in the United States. Projected employment figures for the plant in 1981 estimated that 600 employees would work three shifts when the plant is at full capacity. Typical employment figures for a

plant with similar throughput would have been closer to *1,500* (United Nations Industrial Development Organization 1981). Along with reduced labor requirements comes a reduction in skill requirements and assembly automation. With automated bonding equipment, for example, it only takes two weeks worth of training compared to three months for a worker to become competent at manual bonding (United Nations Industrial Development Organization 1981: 91).

More likely, slots will be available for well-trained manufacturing process engineers. At the same time, U.S. firms maintain their greatest strengths in new product design and are concentrating more than ever on the markets for custom, semicustom, and programmable application-specific chips. These chips are essentially different from the dRAM chips that are used in personal computers and video games and whose production has been dominated by Japanese firms. Advances in custom chips, for example, rely on innovations in the design of the advanced central processing units—microprocessors—that form a computer's "brain." Thus future employment growth in U.S. firms can be expected to favor highly skilled software designers as well as specialists for automating both chip design and manufacture.

A second possible future is that there will be substantial government protection. The industry and the U.S. government have recently concluded that some Japanese manufacturers have been selling chips in the U.S. market below the cost of production, the classic definition of dumping. While the publicly available price series do not suggest a pattern of dumping, experts at the USITC and the U.S. Trade Representative have stated that a clear pattern of underselling was evident among many Japanese firms. As we suggested above, some of the cost difference also appears in the yen price, implying that technical advances in manufacturing by Japanese firms may be at least partially responsible for a lower selling price.

Whatever the truth of the dumping complaint, the two governments agreed to set a floor under the price of 256K dRAMS and erasable programmable read only memories (EPROMs). The agreement, which was intended to protect domestic markets from cutthroat competition by Japanese producers, promises several unintended consequences that may boomerang on the domestic industry and its employees.

The agreement may have the perverse effect of speeding up the pace of offshore production by systems makers. Deep discounting in third markets was reported within weeks of the final agreement. The immediate response by systems producers was to publicly note the incentive

this provided to relocate to be close to low-cost suppliers. The agreement also has the ironic effect of guaranteeing Japanese producers high profit levels. It thus becomes a guarantor of crucial R&D capital. As the industry's capital requirements have escalated rapidly over the last decade, the ability to sustain investment in advanced processes today largely determines market share and profits tomorrow. It is becoming clear that with a high and sustained level of investment, firms hold and increase their success in international markets.

A third strategy U.S. firms could pursue is to build fully integrated production facilities at the market. To a large extent, the advantage of integrating production comes from firms' desire to penetrate new markets. Using industrial location as a tool for generating competitive advantage in final markets is not new to semiconductor producers. The desire to gain market position in new markets has driven the location decisions of European and Japanese firms in locating their production facilities in foreign markets (Finan 1985). The new wrinkle in this strategy is the interest in locating fully integrated production facilities at the market. The spatial reintegration of production at the market is an attractive way to realize the dual advantages of integrated production: fast turnaround time and close contact with the customer during applications engineering and after-sales service, and the ability to take up domestic resources and adjust transfer costs. To a large degree, the shifting contours of the market itself dictate a new location strategy. The market for semiconductors outside the United States, Japan, and Western Europe—particularly the market in the Far East—is projected to be as large as the 1984 consumption in Western Europe, which is the United States's largest export market (Semiconductor Industry Association 1984: 49–50; Scott 1985: 26).[8] The appeal of locating production at the market, in combination with the declining importance of direct labor costs at the plant level, means that in the future the location of offshore manufacturing facilities may result from an attempt to penetrate new markets rather than mirroring, as it largely has in the past, the search for cheap labor.

There are two countervailing tendencies, although they are rather small quantitatively, to the continuing erosion of the domestic employment base in semiconductors. One of these is a shift in the structure of the semiconductor industry, the convergence of circuit design and system design. The ability to directly design systems in silicon is narrowing the differences between chips and systems.[9] The technical capabilities of computer-aided design systems permit design and systems

engineers (which, because of the convergence of circuits and systems, will be increasingly difficult to separate as distinct engineering disciplines) to become the technical core of a new segment of the semiconductor industry—the design and prototyping of custom VLSI chips. This is one part of the strategic response of the industry to the high design costs of VLSI—the "unbundling [of] the overall process of making semiconductors from design through production" (Borrus 1983). As the boundary between systems and chips blurs, there is a critical and yet to be resolved set of incentives that operates on both sides, the motivation to vertically integrate—for semiconductor firms to move into systems and, conversely, for systems houses to move strongly into captive design and, perhaps, production. One piece of the unbundling is the emergence of design centers, essentially engineering service businesses, which will specialize in design and perform limited prototype production. These firms will service systems producers and farm out production to merchant firms or silicon foundries (Bourbon 1984: 120). These "design centers" may also act as brokers between systems houses and silicon foundries. The design services may recommend alternative production facilities to their clients, the systems houses, in much the same way that stockbrokers recommend investments to their clients. Another permutation of unbundling is the shifting of design from integrated circuit manufacturers to systems producers per se. In the next five years, it is likely that the design of custom chips will be almost completely broken off from the merchant firms (see Table 7–8).

If design centers (or in-house design) become as significant as these figures indicate, there will be an incentive to locate silicon foundries close to systems producers.[10] The separation of design and manufacture, at least for custom chips, has several advantages for both manufacturers and systems producers. On the manufacturer's side is the incentive to share the heavy design costs with systems houses. This logic is even more compelling given the cost of new facilities, which are expected to rise at a 25 percent compound annual rate (Integrated Circuit Engineering Corporation 1986: 94). The systems producers would tend to favor silicon foundries that are not tied to the existing or potential systems producers that they compete against. By using Japanese silicon foundries, U.S. producers would be put at a competitive disadvantage since semiconductor and systems producers are typically part of vertically integrated electronic companies (Borrus, Millstein, and Zysman 1980). Thus both domestic production *and* ownership seem likely.

Table 7–8. Responsibility for the Design of Custom and Commodity Semiconductors.

	1984		*1990*	
	Silicon Manufacturing	*Customer*	*Silicon Manufacturing*	*Customer*
Custom	73%	21%	11%	89%
Commodity	100	0	100	0

Sources: Bourbon (1984: 120); Borrus (1984).

CONCLUSIONS

Foreign trade in the semiconductor industry, while first driven by the logic of competition among U.S.-owned firms and then by the growing success of Japanese producers, has produced a clear and consistent set of domestic employment effects. In both periods, the effect of trade alone has reduced job opportunities, particularly for low-level assembly jobs that are most often filled by women. In the first period, however, the fast-paced growth of domestic demand propelled domestic employment creation and swamped the job-destroying effects of trade. In the second period, the story about trade is the same—trade substantially reduced domestic job opportunities for the low-wage workers in the industry. And because of the success of Japanese producers and the slump in the market for computers, those lost opportunities translated into layoffs when the weak domestic market did not counterbalance the loss.

NOTES

1. Semiconductor firms that produce for sale on commercial markets—companies known as merchant firms—are the focus of this analysis. Captive producers—companies like IBM and AT&T that produce chips for internal consumption—do not trade on the world market.
2. The price elasticity of demand is defined as the percentage change in quantity resulting from a 1 percent change in price.
3. Flamm (1985: Table 3–21) used the U.S. Department of Commerce, Bureau of Census (various years) to separate out assembly workers from all other production workers. According to the census definition, nonassembly jobs include managerial, technical, professional, clerical and nonassembly production workers.

4. Women accounted for 32.33 percent of total manufacturing employment in 1983 and 46.38 percent of semiconductor industry employment. (U.S. Department of Labor, Bureau of Labor Statistics 1986).
5. In March 1985 the United States and Japan concluded a bilateral agreement that eliminated tariffs on semiconductors and integrated circuits. From a research standpoint, this means that after 1985 it is impossible to track reimportation of devices that domestic firms ship offshore for partial assembly and processing. This will become an especially significant lacuna as countries that have been and continue to be important sites for offshore production by American firms also develop domestic semiconductor capacities of their own. The reduction of bilateral tariffs on semiconductors and integrated circuits is another mark of the transition to the second stage of international trade. For, even as offshore assembly and testing continued to be important sources of imports—even after the abolition of tariffs—this international division of labor did not prove to be a successful response to international competition coming primarily from Japanese producers.
6. One should keep in mind that the value of semiconductor (SIC 3674) shipments represents about 35 to 40 percent of the value of shipments of the broader category of electronic components (SIC 367).
7. A fall in the index means an appreciation of the yen.
8. Scott points out that the market for semiconductors in Southeast Asia has grown quickly over the last decade and that 16 percent to 18 percent of semiconductor shipments from U.S.-owned branch plants in Southeast Asia are made within the region.
9. The relationship between a circuit and a system changes as technology changes. As the number and sophistication of functions increases, "components are technically able to implement basic features of what previously had been regarded as an electronic system" (Borrus, Millstein, and Zysman 1980: 22).
10. Design centers are the companies that provide circuit design and prototype construction but do not manufacture circuits themselves. Silicon foundries are companies that manufacture semiconductors that are designed by outside sources (in this argument, they are either design centers or circuits that are designed by the systems producers themselves). It is presently standard practice for merchant firms to use one or more of their production lines for contract work, essentially a silicon foundry type of arrangement. However, this is typically only done during periods of excess capacity.

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EDUCATION

1987 Ph.D. — Department of City and Regional Planning
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Dissertation: Flexible Production Technology and Industrial Restructuring: Case Studies of the Metalworking, Semiconductor and Apparel Industries

Fields of Concentration:
labor economics (field examination with honors);
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1981 M.Pl. — School of Urban and Regional Planning
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FELLOWSHIPS AND AWARDS

Travel Grant, Center for International and Comparative Studies, The University of Iowa, 1988. $1,000.

Old Gold Summer Fellowship, University of Iowa, 1988.

Distinguished Teaching Assistant 1984-85, Committee on Teaching of the Berkeley Division of the Academic Senate, University of California.

Regent's Fellowship, University of California, Berkeley, 1983-84.

Lasker Fellowship, University of California, Berkeley, 1981-82.

Newhouse Fellowship, University of California, Berkeley, 1983.

James Irvine Fellowship, University of Southern California, 1979-81.

Irvine Company Scholarship in Urban Design and Environmental Planning, 1979.

CURRENT PROJECT

1988 Immigration Policy Group, International Labor Affairs Bureau, U.S. Department of Labor. "Immigration and Regional Labor Market Adjustment in the U.S. Apparel Industry" ($7,500). Principal Investigator.

PUBLICATIONS

"The Domestic Employment Consequences of Managed International Competition in Apparel." In Laura D'Andrea Tyson, John Zysman and William T. Dickens, eds., The Dynamics of Trade and Employment. Cambridge, MA: Ballinger, 1988.

"The Changing Shape of Domestic Employment in a High-Tech Industry: The Case of International Trade in Semiconductors." In Tyson et al., The Dynamics of Trade and Employment. Cambridge, MA: Ballinger, 1988.

The New Technologies in Manufacturing and Their Effects on the Work Force, CPL Bibliography #167. Chicago, IL.: Council of Planning Librarians, January 1986.

"The Development of Programmable Automation in U.S. Metalworking Industries," BRIE Working Paper #15. Berkeley: UC Berkeley, Berkeley Roundtable on the International Economy, September 1984 (Carol Parsons and Robert Scott).

Book review of Palmer and Sawhill, eds., The Reagan Experiment: An Examination of Economic and Social Policies Under the Reagan Administration. In American Planning Association, Human Services & Social Planning Newsletter, Vol. 5, No. 1, April 1983, pp. 6-7.

PRESENTATIONS AT MEETINGS

"Neo-Fordism and Regional Development Theory." Presented at the Regional Development Seminar, Hubert H. Humphrey School of Public Affairs, University of Minnesota, May 31, 1988.

"Everything Old is New Again: Technological Innovation and the Return of Agglomeration Economies." Presented at the American Collegiate Schools of Planning meeting. Los Angeles, California, November 5-8, 1987.

"New Technology and Labor Relations in a Traditional Sector: The Evolutionary Transformation of the Domestic Apparel Industry." Presented at the American Political Science Association meetings, Chicago, Illinois, September 3-6, 1987.

"New Technology in a High-Tech and a Traditional Industry," Presented at the Lincoln Land Institute, University of California, Berkeley, October 9, 1986.

UNIVERSITY SERVICE

Financial Aid Subcommittee, Graduate Program in Urban and Regional Planning, University of Iowa, 1987-1988.

Guest Speakers Committee, Graduate Program in Urban and Regional Planning, The University of Iowa, 1987-88.

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PROFESSIONAL ORGANIZATIONS

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1. The Political Economy of Regional Development in Industrialized Societies
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ADDITIONAL EXPERIENCE

Research Specialist. Berkeley Roundtable on the International Economy (BRIE), University of California, Berkeley. January 1984 to June 1987.

Conducted research on the effect of international trade on domestic employment, and on the diffusion and deployment of new manufacturing technologies and their effects on industrial location and employment.

Teaching Associate. Department of City and Regional Planning, University of California, Berkeley. Fall 1982 - Spring 1986.

Assisted with courses in public sector economics (3 terms), regional planning (1 term), analytic methods (1 term), introduction to city planning (2 terms), and the political economy of planning (1 term).

Policy Analyst. Debt Advisory Commission, Treasurer's Office, State of California. June 1983 - August 1983.

Examined status of state and local government bonded indebtedness and prepared an analysis of policy instruments to aid local government in coping with the fiscal effects of Proposition 13.

Consultant. Mayor's Office of Finance, Oakland, California. October 1982 - January 1983.

Member of a team which prepared the fiscal impact report on the downtown redevelopment plan.

Policy Analyst. Hamilton, Rabinovitz, and Szanton, Inc.
Los Angeles, California.
August 1980 - August 1981.

As a member of the team that prepared the fiscal impact study of the proposed MX missile system. I evaluated the impacts of the proposed construction on school districts in Utah and Nevada. Also was a member of the oversight team for the implementation of the school desegration order for the Los Angeles public schools.

ADDITIONAL EXPERIENCE - Continued

Planner. Nossaman, Krueger, and Marsh
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Worked as a land use planner with a natural resources and land use law firm. Drafted legislation and advised clients on the permitting process, the regulatory issues involved in the provision of low and moderate income housing, and infrastructure and development finance.

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