



Title:

Creating Advantage: Strategic Policy for National Competitiveness

Author:

[Tyson, Laura D'Andrea](#)

Publication Date:

01-02-1987

Series:

[Recent Work](#)

Permalink:

<http://escholarship.org/uc/item/9b38c3p1>

Keywords:

family history, Mendelian disorders, chronic disease, disease prevention

Abstract:

Recognizing Mendelian disorders should improve health care for persons with strong familial risks for common chronic diseases. The Online Mendelian Inheritance in Man (OMIM) database was reviewed to identify Mendelian disorders featuring 17 common chronic diseases, including 9 cardiovascular conditions, diabetes, and 7 common cancers. Mendelian disorders were selected if any one of the 17 diseases was reported in more than two families manifesting in adulthood. Patterns of chronic diseases and modes of inheritance associated with these Mendelian disorders are described. The GeneTests/Reviews database and other websites were reviewed to determine availability of genetic testing and management and prevention recommendations for the selected disorders. Of 2,592 (OMIM) entries reviewed, 188 Mendelian disorders were selected. Most (67.7%) are autosomal dominant disorders. Almost half (45.8%) feature combinations of the chronic diseases under study. At least one gene is known for 68.8% of the selected disorders, and clinical genetic testing is available for 55% of disorders. Guidelines for management and prevention are available for 33.9% of these, ranging from recommendations for supportive care to guidelines for managing affected persons and screening relatives. Significant clinical heterogeneity exists for Mendelian disorders that might present as strong family histories of common chronic diseases. Recognition of the different combinations of diseases within a pedigree, including mode of inheritance and heritable disease risk factors, facilitates diagnosis of these Mendelian disorders. Genetic testing is available for most disorders, which can further clarify the genetic risk, and for some, recommendations for management and prevention are available. However, evidence-based guidelines are needed. Published 2004 Wiley-Liss, Inc.dagger.

Copyright Information:

All rights reserved unless otherwise indicated. Contact the author or original publisher for any necessary permissions. eScholarship is not the copyright owner for deposited works. Learn more at http://www.escholarship.org/help_copyright.html#reuse



**Creating Advantage:
Strategic Policy for National
Competitiveness**

Laura D'Andrea Tyson

Working Paper 23
January 1987

1

During the last several years, the dramatic deterioration of the U.S. trade deficit has instilled new life into the debate about whether and how government should promote national competitiveness. As industry after industry, ranging from low-wage, labor-intensive apparel to high-wage, technology-intensive semiconductors, has lost world market share, scaled down domestic production and employment, or shifted operations abroad, concern over the competitiveness of U.S. industry has mounted, and the consensus view that free trade always improves national welfare has weakened. In the face of changing economic reality, both accepted theory and accepted policy positions have been battered. Policymakers who were once convinced that there was no legitimate role for government policy to influence the composition of U.S. trade and industrial output are beginning to reexamine their positions. Even professional economists, the majority of whom believe that the deteriorating U.S. trade position is mainly a macroeconomic problem -- or simply a problem of short-term adjustment -- are beginning to consider complementary explanations that focus on longer-term trends in the U.S. competitive position in a variety of industries and in different world markets.

As the dissonance between shifting economic reality and accepted notions of how the world behaves strengthens, alternative viewpoints that have been overlooked or discounted are being reexamined or rediscovered. Evidence that was assiduously denied because it was inconsistent with the basic tenets of accepted theory is now being incorporated by judicious changes in some of them. As a result, arguments and conclusions that are a standard part of the industrial policy literature are appearing, often in different guise and sometimes without attribution, in both policy and theoretical discussions.

Within the academic debate, the rapid development and growing popularity of the so-called new trade theory are symptomatic of this trend. This theory takes as its starting point the observation that a large and growing share of world trade is not explainable in terms of traditional trade theories of comparative advantage, nor is it amenable to the assumptions of perfect competition on which these theories rest. Once these assumptions are relaxed, it is easy to demonstrate that there are many theoretical circumstances under which government policy can have a long-term, welfare-improving effect on national production and trading patterns. At least as a theoretical possibility, the new theory does not rule out interventionist government policy to promote domestic production and to create national advantage in world markets. Whether policy is warranted turns on the specific features of the industries in question, in particular on features of their market structure, the input markets in which they operate, and the spillover or externality effects they generate for the rest of the economy. A natural conclusion, although one not often emphasized or even acknowledged by contributors to the new theory, is that under certain conditions government policy intended to influence the composition of the national economy, often labeled industrial policy, may improve national economic welfare compared to free-market outcomes.

Given the growing skepticism about traditional ways of explaining trade patterns and the growing bipartisan concern over U.S. competitiveness, the time seems ripe for another look at some of the conclusions of scholars who argue that government policies to influence the composition of the national economy and to promote national competitiveness can be welfare-improving. The work of such scholars is often analyzed under the label of industrial policy,

a term that is out of favor for political reasons and that carries the connotation of government interference in markets to pick winners and losers. To call a particular policy perspective an industrial policy perspective in U.S. academic and political debates is to give it a kiss of death. But even as the need for and wisdom of industrial policy are denied, there is growing recognition of the role of government policy in promoting economic adjustment and development that assures a high-wage, fast-growth, full-employment economy. And the experiences of Japan and many of the successful newly industrializing countries (NICs) demonstrate that such a role for policy can have long-term, welfare-improving effects on domestic and international economic performance.

In the new international economic environment, the traditional theory and policy perspectives that characterize U.S. economic discourse must be modified to fit new economic realities. The real policy choices are not between free trade and protection or between macroeconomic policy and industrial policy to pick winners and losers. Rather, the meaningful choices are over the appropriate set of macro and micro policy tools to promote long-term growth and competitiveness and to sustain a high-wage economy in an increasingly interdependent world.

This paper is written with the hope of contributing to this new more meaningful formulation of policy debate over government policy and its role in shaping economic performance. The paper examines four major propositions that are drawn from ongoing research on the effects of government policy on competitive dynamics in international trade.¹ The first proposition is that there has been a long-term erosion in the U.S. competitive position in world trade, an erosion that is not simply the result of the inevitable catch-up of

the rest of the world to U.S. productivity levels, but the result of policy actions both at home and abroad that have influenced the pace and extent of the catch-up. This erosion predated the dollar's spectacular climb between 1980 and 1985 and is an important reason why the dollar's recent fall has failed to produce the anticipated improvement in the U.S. trade deficit.

The second proposition is that government policies can and do have enduring effects on competitive outcomes in international markets. In most sectors of significance to trade among the advanced industrial countries and the NICs, competitive advantage in international trade is created by the interaction of government policy and business strategies, not embedded in unchanging technology and natural resource endowments. Under many conditions, government policy to ease adjustment in such sectors when they face contraction or to promote their expansion can be shown to be welfare-improving.

The third proposition builds on the idea that certain industries, especially the research-intensive high-technology industries, are strategic in the sense that they generate spillover effects throughout the national economy. Given the extent of these effects now and in the future, a strong *prima facie* case for promotional policies to support research and development, investment, and national competitive advantage in such strategic activities can be made. Finally, the fourth proposition is that the ongoing revolution in both production and communications technology has long-term implications for international trading patterns and for the effectiveness of alternative government strategies to sustain national competitiveness.

The remainder of the paper elaborates on each of these propositions, examining their implications for policy and for the development of new

analytical perspectives on the forces that create national patterns of advantage and drive international trade.

1. The Competitiveness Problem of the U.S. Economy

There is a growing perception among academics and policy members alike that the U.S. suffers from what has come to be called a "long-term competitiveness problem." Inevitably, this perception strengthened as the U.S. trade deficit deteriorated during the last several years. Whether under the label of "industrial policy" or under the label of competitiveness policy, research and policy debates are increasingly focused on understanding the reasons and solutions for the decline in the U.S. competitive position.

Among economists there is a heated debate about the existence of a long-term competitiveness problem in the U.S. economy. The dominant view is that given the correct exchange rate, U.S. firms would be able to compete successfully in world markets and the U.S. merchandise trade balance would decline dramatically. To economists and policymakers who are worried about a competitiveness problem, this view, while logically correct misses the crucial point. Competitiveness is not simply a measure of a nation's ability to sell abroad and to maintain a sustainable trade position. The very poorest nations in the world are often able to do that reasonably well by exchange rate adjustments. If their productivity lags behind that of their trading partners, they accept a decline in the value of their currency, their relative wages and their relative standard of living.

If national competitiveness is defined in the broader sense as the ability to compete effectively in world markets while simultaneously raising real incomes, then there are several indicators that there has been a secular decline in the U.S. competitive position beginning in the mid-1960s. A number of such indicators have been identified and examined in the industrial policy literature, including: the erosion of U.S. shares in world export markets for

manufactured goods, including high-technology goods, between the late 1960s and 1980, despite a major real depreciation of the dollar between 1977 and 1979; the erosion of U.S. shares of world exports of productive services as opposed to service flows representing earnings on overseas investment since 1973; and case-study and macro evidence of a relative decline in U.S. technological capability compared to levels realized in Japan and West Germany.²

Perhaps the most telling evidence of a long-term competitiveness problem comes from an examination of U.S. productivity performance. In the decade and one-half before 1983, there was a pervasive and substantial decline in productivity growth rates throughout most sectors of the American economy. Moreover, for at least that length of time, productivity grew far less rapidly in the United States than it did in its major trading partners. U.S. productivity growth turned up in 1983 and 1984 in response to the economic recovery, but the improvement was no better than in previous economic recoveries and did not indicate that the disappointing longer-term trend in productivity had been reversed (Baumol and McLennan, 1985).

As a result of two decades of relatively poor productivity growth, the substantial advantage in productivity levels enjoyed by U.S. producers has all but disappeared. In several sectors, such as steel, autos, machine tools, and semiconductors, productivity levels in other advanced economies equal or exceed U.S. levels. If faster productivity growth persists abroad, as is currently the case, then what has previously been a catch-up of foreign productivity levels to U.S. levels will become a gradual fallback in U.S. productivity levels relative to those abroad.

Ironically, seen from a long-term perspective on U.S. competitiveness, the dollar appreciation between 1980 and 1985 far from being a sign of the strength of the U.S. economy was an indication of its weakness. By 1985, the appreciation had brought the dollar back roughly to its 1970 level in real terms. Yet a real exchange rate that was associated with a current account deficit in 1970 was associated with a massive and unsustainable current account deficit in 1985 (Krugman, 1985). Over the long run, there will have to be a substantial real depreciation of the dollar to reflect the long-term erosion of the U.S. competitive position in world markets. In the words of the 1984 Economic Report of the President, "to believe otherwise would be to believe that U.S. producers can continue to be priced out of world markets and that the U.S. can continue to run 12-digit trade deficits indefinitely" (CEA, 1984, p. 53).

Significantly, despite supply-side rhetoric, U.S. policy choices during the last six years failed to address the underlying sources of the long-run decline in U.S. competitiveness. Investment rates, while rising from cyclically depressed levels in 1981-82, remained low compared to our major competitors, and the U.S. saving rate, already low by international standards, fell to record lows in 1984-85. Civilian research and development, although increasing in some areas of the economy, remained a smaller fraction of GNP than in Japan or Germany, and the most rapid peace-time military build-up in history drew scientific and engineering talent into military projects with limited commercial applications for the foreseeable future (Stowsky, 1985). The quality of the U.S. labor force continued to suffer from long-term difficulties in our educational system resulting in higher illiteracy rates, poorer math and science training, and higher drop-out rates than in the other

advanced economies. Reflecting our continued long-term competitive difficulties, productivity growth stagnated after mid-1984 and actually fell in the non-farm sectors of the economy in 1985 despite our economic recovery.³

When viewed against the backdrop of the growing debt-service obligations of the future, these trends are particularly disturbing. The massive amounts borrowed from the rest of the world have been used to fuel current consumption and government spending, not to build productive capacity for the future. Moreover, the disproportionate burden of a high dollar on the tradable goods sectors of the economy has lowered productive potential in these sectors relative to what it would have been by depressing investment and encouraging the offshoring of productive capacity. As a consequence, Americans will have to service their growing international obligations out of human and physical capital stocks whose growth paths have not been altered and whose allocation has shifted toward non-tradables. The result must be that future debt servicing will exact a larger toll on future U.S. incomes than would have been the case if foreign borrowing had been used to restore U.S. competitiveness.

Some critics, most notably influential economists like Krugman (1985a) and Lawrence (1984), question whether there is a competitiveness problem in the U.S. and if so whether it is severe enough to merit policy concern. They attribute the massive deterioration in the U.S. trade position during the last several years to the appreciation of the dollar between 1980 and 1985 and more recently to anticipated lags between the decline in the dollar and its effects on the trade balance (the so-called J-curve effect). According to this view, the villain behind the recent pronounced decline in U.S. competitiveness is the behavior of the exchange rate, and this in turn is the result of large

macroeconomic imbalances in the world economy, many of which are rooted in U.S. monetary and fiscal policy choices after 1980.

These critics sometimes concede that there has been a longer-term erosion in U.S. competitiveness that predates the dollar's climb, but they view this erosion as the result of a natural and presumably beneficial catch-up process in the rest of the world. As the U.S. share of world capital and skilled labor has declined and as the gap between the U.S. and the rest of the world in endowments of capital, skilled labor, and technological ability has narrowed, the U.S. share of world trade and its shares of trade in high-technology, skill-intensive and capital-intensive products have declined. As a result of the nature of growth in the rest of the world, U.S. terms of trade for manufactured goods have deteriorated, but estimates, such as those of Lawrence (1984), suggest that through 1980 the deterioration was relatively small. Using Lawrence's estimates, Krugman argues that the real income losses occasioned by the terms-of-trade deterioration for U.S. manufactured goods have also been small, perhaps amounting to a decline in real income growth by roughly 0.12 percent a year (Krugman, 1985a).

Furthermore, according to these critics, estimates of this type probably overstate the real-income losses attributable to the relative decline in the U.S. competitive position because they focus on trade in manufactured goods. If, as most of these critics believe, the relative decline in U.S. manufacturing capabilities simply reflects the inevitable transition of the U.S. toward a service economy and a growing comparative advantage in services, then the focus on relative manufacturing capabilities characteristic of much of the industrial policy literature is misguided. Finally, even if the U.S. is experiencing an overall decline in its relative competitive position

extending to internationally traded services, such as financial, consulting and construction services, this should not be cause for concern since on an absolute standard, levels of U.S. per capita income, wealth and productivity are among the highest in the world.

There are several ways to respond to those who argue that the U.S. competitiveness problem is either non-existent or at best insignificant. First, the crucial role of exchange rate changes in the erosion of U.S. competitiveness since 1980 must be acknowledged.⁴ To do otherwise would fly in the face of overwhelming macro and microeconomic evidence about the role of the dollar in mounting U.S. trade deficits. Indeed, scholars and policymakers who are concerned about longer-term trends in competitiveness have emphasized the long-term effects of the protracted overvaluation of the dollar on the U.S. industrial base. The standard macro view suggests that a simple decline in the dollar's value will restore the competitiveness of U.S. producers and reverse recent declines in U.S. shares of world markets. This view, however, misses the point that because of the size and persistence of the dollar's overvaluation, many U.S. producers have abandoned markets altogether or have moved production offshore while many foreign firms have entered markets that were previously dominated by U.S. producers. As a result of these costly adjustments, a return of the exchange rate to its former level will not be enough to restore the competitive position or world market shares of U.S. producers in many industries.⁵

Any long-term effects of the dollar's overvaluation on U.S. competitiveness aggravate or accelerate secular trends that were already obvious by the end of the 1960s. Moreover, these trends, far from being simply the inevitable result of the catch-up of the rest of the world, have

been significantly influenced by U.S. policies that have depressed productive investment rates, allowed the educational system to deteriorate, and failed to allocate sufficient resources to civilian, commercially targetted research and development. Korea, Japan, France or other countries cannot be blamed for relatively poor U.S. performance. Although foreign targetting policies in industries that compete with U.S. exports, especially high-technology industries, may have caused considerable damage, not these policies but poor domestic policies are the most important source of U.S. competitive difficulties. Japan attracts attention not so much because its policies are designed to hurt U.S. competitiveness, but because they provide a standard against which U.S. policy failures become more apparent.

A second argument against the critics who gainsay the existence of a national competitiveness problem is a technical one. The Lawrence-Krugman measures of real income losses attributable to deterioration in the U.S. terms of trade for manufactured goods are underestimates because they are based on the assumption that the U.S. growth rate remains one-third lower than the growth rate of the rest of the world, as it was from 1964 through 1980. If instead, it is assumed that the U.S. grows at about the same rate as the rest of the world, an assumption that seems more in line with U.S. policy objectives, then the decline in the value of the dollar required to maintain trade balance in manufactured goods and the real income losses involved would be much larger.⁶ Under either assumption, evidence from the mid-1970s through 1980 indicates that improvement in the U.S. trade balance for manufactured goods requires a persistent erosion in the growth of U.S. real incomes. In other words, the U.S. has a long-term competitiveness problem as broadly and appropriately defined.

Conventional analysts often argue that the erosion in U.S. manufacturing competitiveness is not cause for policy concern because it reflects a market-driven transition to an 'information-based service economy,' and a growing U.S. comparative advantage in services. There are several flaws in this line of reasoning. The first is that after deducting service trade representing capital flows, the volume of U.S. "productive" service exports is small. For example, after deducting exports of military hardware (which are surprisingly counted as service exports), the U.S. realized \$55 billion in productive service exports in 1985. This compares with a total of \$410 billion in imports in that year. Second, the U.S. share of world markets for such exports declined during the 1970s.⁷ Third, many services are what Cohen and Zysman (1987) call "tightly linked" to manufacturing activities, in the sense that competitive difficulties in these activities are likely to cause competitive difficulties in related engineering and design services, software design, business consulting services, and repair and maintenance services. Similarly, the erosion of the U.S. competitive position in capital-goods industries, such as construction equipment and robotics, is likely to spill over into an erosion in related construction, engineering and architectural services.

Where linkages between services and products are tight, services are often specialized for particular products or even for particular suppliers, and these services together with the products they support or use are best thought of as an interrelated system rather than as separate commodities. This is especially true for many high-technology products and their specialized support services. Under these circumstances, close frequent communication between producers of output and specialized services is common,

and such communication involves more than just the exchange of price information and often involves a substantial element of risk on both sides that results in long-term contractual relationships. For tightly linked services, it is hard to imagine how a competitive erosion in product lines in world markets would not spill over into an erosion in related services.

Finally, conventional economic arguments about the inevitable and therefore beneficial transition to a service economy fail to distinguish among different types of services and the different kinds of jobs they entail. Most services, such as retail services, restaurant and other entertainment services, health and educational services, are driven by consumer and welfare needs. Many of the jobs in such service areas are low-skill, low-paying jobs with high turnover and poor training and advancement prospects. In contrast, services that cater to business needs, such as financial, legal, engineering and consulting services support high-skill, high-paying jobs. The evidence on service job creation in the U.S. during the past several years suggests that by far the largest number of new service sector jobs were the first type rather than the second. Fully 75% of the new jobs gained since 1979 were in the retail and business/health services sectors, both of which pay substantially below the manufacturing and the average wage for the economy.⁸ As the U.S. was losing industrial sector jobs, many of which were highly-paid, high-skill jobs, it was gaining poorly paid, low-skill service sector jobs.

This job creation and job destruction pattern indicates that as a result of U.S. competitive difficulties in world markets, "strategic" jobs in the sense of jobs that pay more than what labor could earn elsewhere in the economy were being destroyed. Recent empirical evidence reported by Thurow (1986) supports this interpretation. According to his evidence, both

exporting and import-competing industries have higher median earnings and have more equal earnings distributions than the economy as a whole.⁹ As a consequence, when exports contract and imports expand, as they have in the 1980s in reaction to the overvalued dollar and longer-term competitiveness difficulties, average earnings in the economy fall and the distribution of income becomes more unequal. This evidence suggests the disturbing conclusion that the erosion in the U.S. competitive position is destroying not low-earning, low-skill jobs but high-earnings, relatively high-skill jobs. This job destruction pattern in turn is one of several factors contributing to the surge in income inequality in the U.S. since the late 1970s.¹⁰

Finally, as critics of the competitiveness problem contend, those who are concerned about the erosion in U.S. competitiveness tend to focus on the deterioration in the U.S. relative position rather than on the strength of its absolute position in output, productivity, trade shares and other indicators of economic performance. It is also true, as a consequence, that the competitiveness literature tends to be nationalistic in tone, focusing on issues of relative national welfare rather than on issues of aggregate welfare independent of how it is distributed among nations. This is another reason why this literature has attracted attention in national policy and business circles. As most of us realize from our own personal experience, the tendency to determine how well one is doing by comparison to others is widespread. Actual or potential deteriorations in one's relative standing suggest that something might be amiss, that one might be doing better even if the absolute level of success is high. This seems like a reasonable perspective from which to assess national economic policy and to determine room for improvement.

The focus on national economic performance also means that indicators of national economic competitiveness rather than indicators of the competitiveness of individual firms whose headquarters are in one nation but whose production and distribution facilities are internationally dispersed are the relevant subject for policy concern. The fact that exports of U.S. multinationals from offshore facilities did not lose world market share in the 1960s and 1970s while exports from the U.S. did means that U.S. producers operating abroad were able to maintain their competitive position, while U.S. producers operating at home were not. This is compelling evidence of a national competitiveness problem, and this in turn is a legitimate cause for national policy concern.

2. Strategic Activities and the Effects of Government Policy on Competition in International Trade

A second proposition supported by ongoing theoretical and empirical research by a diverse group of scholars is that government policies can have permanent effects on the patterns of trade flows and on the distribution of national welfare resulting from such flows. Motivating much of this research is the observation that a large and growing share of world trade consists of exchanges that cannot be explained by traditional theories of either absolute or comparative advantage. Intra-industry trade and trade in high-technology products are the most obvious examples. Such trade is not explainable in terms of raw material endowments or relative factor endowments, nor is it consistent with the assumption of perfect competition on which traditional theories are based. For such trade, the competitive advantage of different national producers is "created" or shaped over time by the actions of both business and government.¹¹

The idea that government policy can help create or destroy competitive advantage in international trade encompasses both a macro and a micro argument. At the macro level, it seems undeniable and even uninteresting that government policies can affect comparative advantage over time by influencing the quantity and quality of labor, capital and technology. An absolute or comparative advantage in capital-intensive or technology-intensive industries is not an immutable fact of nature, but the result of a host of interrelated economy-wide policies that affect the incentives to save, invest, acquire human capital, and innovate and diffuse technology. This point, although basic, is often overlooked by those who view the gradual erosion in the U.S. competitive position in such industries or the gradual strengthening of Japan

and the East Asian nations in the same industries, as the result of a natural catch-up process. Both the extent and the pace of the catch-up were significantly influenced by policy choices in all of the countries involved.

Much of the industrial policy literature addresses itself to the macro aspects of how government policies affect competitive advantage over time. For example, the works of Thurow (1985) and of Scott (1985), and work for the President's Commission on Industrial Competitiveness by Cohen et al. (1984) examines a variety of government policies to determine how they have affected savings, investment, technological change and productivity growth in the U.S. and in several of its trading partners. Although it is difficult to come up with a single quantitative measure of the effects of such policies on the interrelated macro determinants that shape competitive advantage over time, a strong qualitative case for the critical influence of national policy differences on these determinants has been made.

The notion of creating advantage at the micro or industrial level is both more interesting and more controversial. This notion rests on the observation that a large and growing part of world trade consists of exchanges that do not reflect national differences in resource endowments, even those resources whose quantity and quality are influenced by government policy. Instead, such trade reflects apparently arbitrary or temporary advantage resulting from static or dynamic economies of scale or from shifting positions in technological leadership or from product differentiation and other forms of "imperfect" non-price competition. For trade in these products it seems obvious that national policies can have an enduring effect on trade flows and national welfare, and it is this proposition that has captured the attention of the new trade theory.

The new trade theory has concentrated on demonstrating that under certain conditions, national policies to promote or protect domestic producers in international competition can improve national welfare. There are essentially two different types of conditions that give rise to results of this kind. First, industries that are "imperfectly" competitive, most often as a result of static and dynamic economies of scale¹² earn super-normal returns (quasi-rents) in the sense that resources employed by them earn higher returns than those available in the rest of the economy.¹³ Under these conditions, national welfare may be improved by government policy to win larger market shares for domestic producers in world markets and hence a larger share of world profits for the domestic population. A second set of conditions that provide a justification for welfare-improving policies draws on standard notions of externality or spillover effects. Simply put, certain industries may be more important than others because they generate benefits for the rest of the economy, and government policy to promote or protect them can improve welfare by fostering these spillover effects. Under both sets of conditions, the industries involved are defined to be "strategic" either in the sense that resources employed by them earn higher returns than they would earn elsewhere or in the sense that they generate special benefits for the rest of the economy (Krugman, 1986).¹⁴

The notion of strategic industries or sectors is also a central component of the industrial policy literature, and it has developed naturally out of empirical research on how and why different governments have used policy to affect trade and production patterns. The research on how government policy creates advantage at the micro or sectoral level has focused on three main questions: first, are there circumstances under which government policy to

aid adjustment or promote expansion of individual sectors or activities can be welfare-improving; second, are countries, such as Japan, France and South Korea actually using policies for such purposes; and third, have these policies had a permanent effect on their competitive position in certain industries and on their national production and trading patterns. A fourth question of great importance is whether when such policies have been used their benefits in terms of national welfare gains have outweighed their costs. As is indicated below, this fourth question is extremely difficult to answer because of the long lags and spillover effects involved between the targetting of one sector at one point in time and the consequences for that sector and other sectors of the economy over time.

Much of the empirical research on how government policy creates advantage at the micro level has focused on high-technology sectors and on Japan for case-study evidence (see, for example, the works of the scholars at the Berkeley Roundtable on the International Economy). This research indicates that the Japanese government has used a host of interrelated policies, some aggregate, some industry specific, some formal, some informal, to target certain industries and that these policies have had an enduring effect on Japanese trade patterns in specific sectors.¹⁵ These conclusions are shared by a variety of regional specialists and industry analysts who have studied Japanese policy in specific industries during the postwar period.¹⁶ Most recently, case-study work by BRIE scholars has demonstrated the role of policy in the evolution of Japanese production and trade in the consumer electronics industry, the semiconductor industry and the telecommunications industry. This work suggests that an interrelated set of protectionist and promotional policies has given Japanese producers the advantages of large-scale production

and cumulative production and research experience that have been critical to their export successes in related products.

The Japanese approach to these and other industries is an industrial policy approach in the sense that it is motivated by the goal of guiding or influencing the structure or composition of the economy in specific directions. As this sense implies, industrial policy is correctly defined more by its objectives than by its technique. Certainly, industrial policy must be construed much more broadly than trade policy, although it may encompass traditional trade policies, such as tariffs, tangible and intangible non-tariff barriers, and related policies, such as controls over direct foreign investment. In the Japanese case, these kinds of policies have been used in conjunction with a variety of other policies, including tax and subsidy policy, financial and interest-rate policy, research and development policy, and antitrust policy. The actual mix of policies has changed significantly over time, and many observers argue that both the extent and the strength of policy intervention have declined since the early 1970s. Nonetheless, the long-term effects of earlier or continuing policy intervention on trade patterns in targetted sectors persist because of the long-term nature of the advantages created by such intervention.

A careful examination of Japanese industrial policy indicates that it has been what might be called "market-conforming" or "market-promotional" in its objectives. It has been designed to promote or accelerate the development of sectors deemed to be both privately and socially profitable and to manage the decline of sectors deemed to be both privately and socially unprofitable. This does not mean, of course, that decisions based on this principle have always turned out to be correct. Targetting the steel and shipbuilding

industries may have been a wise market decision in the 1950s and 1960s but it turned out to be a questionable one in the 1970s. The same may turn out to be the case for the semiconductor industry sometime in the twenty-first century. Both government and private decision-makers make decisions that are wise by one set of market parameters but appear foolish by another. This is simply an inescapable result of decision-making under uncertainty and changing economic conditions.

From a standard economic perspective, policies to manage industrial decline can be understood in terms of adjustment costs. Adjustment costs refer to the costs involved in moving productive resources from one activity to another. The most obvious adjustment cost is the output lost during the period when resources shed by a declining industry are unemployed before they find alternative uses elsewhere in the economy. Another is the output lost when resources shed by such an industry find employment in activities that enjoy lower productivity than the activities they left behind. To these losses must be added the output losses due to the erosion of community infrastructure and service activities when industrial decline is geographically concentrated, as in the case of the decline of heavy industry in the mid-western region of the U.S. Finally, to "static" adjustment costs stemming from resource underutilization of the types discussed here, can be added possible "dynamic" adjustment costs that might arise when the firms surviving an industry's decline are so weakened financially that they cannot take on profitable investments that would add to their future productivity and competitiveness.

Economists tend to pay lip service to the notion of adjustment costs. After stating that they exist and that they might even be substantial in some

cases, economists tend to dismiss them as the consequence of "market imperfections," and to pursue their analysis of the advisability of policy intervention as if they did not exist. Indeed, economists sometimes refer to the "natural speed of adjustment" implying that in the absence of policy distortions, there is some optimal adjustment pace that the market will find to minimize adjustment costs. This perspective is based on an implicit belief that resources move rapidly from one activity to another in response to market signals and that competition quickly eliminates any large deviations between what equivalent qualities of resources can earn in different activities. It also rests on the belief that capital markets are perfect in the sense that they recognize the future profitability of the firms that will survive an industry's decline even though the process of that decline may depress current financial indicators. A related belief is that a market-driven pattern of decline will always result in the optimal outcome in the sense that the most efficient firms will survive while the least efficient will be forced out of business.¹⁷

The traditional economic perspective is based on an underlying confusion between market imperfections and market institutions. Markets are institutions and they are embedded in a set of supporting and related institutions that shape economic performance, including the pace of market adjustment and the adjustment costs involved. Among the many institutional factors that influence the magnitude and distribution of adjustment costs associated with a given degree of structural change are: the geographic concentration of different industries; the skill, mobility and unionization of the labor force; the nature of anti-trust and bankruptcy laws; the relative reliance of industry on debt and equity finance; the existence of investment

banking institutions; the relationship between bank management and firm management; and the pay-out ratio expected by firm stockholders. To call these factors market imperfections and then ignore them is to miss the point that their effects can be mitigated or aggravated by policy. It is this point that motivates much of Japanese industrial policy, including the much touted recession and rationalization cartels and worker and community adjustment assistance programs. And it is this point that is usually overlooked by U.S. policymakers. How else can one explain the scaling down of federal adjustment assistance programs during the 1980-86 period when the pace of trade-induced structural change quickened or a series of decisions to provide "temporary" protection to industries in the throes of structural decline, such as apparel, steel and automobiles, without linking it to a detailed adjustment program.¹⁸

Even economists who are willing to entertain the notion that industrial policy may be "market-conforming" and beneficial when used to moderate the adjustment costs associated with industrial decline, are often unwilling to acknowledge any defensible rationale for market-promoting industrial policy to accelerate the growth of profitable industries, except in the presence of externalities or market imperfections in the usual sense. Such economists find the assertion that Japanese industrial policy worked to promote firms "to adopt successively newer technology and to invest rapidly" (Yamamura, 1986) puzzling at best. Why, if these activities were profitable by market criteria, did firms need to be promoted? One interpretation is that they did not need any such prompting, that things would have turned out rather as they did without industrial policy, in which case such policy had no real effect. An alternative interpretation is that policy promoted firms to do more than they otherwise would have done, in which case, in the absence of externalities

or other imperfections, there were hidden welfare costs associated with what was defined as market-conforming policy. Since the usual tendency among economists is to treat imperfections or externalities as annoying exceptions to the market rather than as the rule in most markets and to define them in quite narrow, precise and quantifiable ways, this alternative interpretation is the one usually given most support by academic economists.

If market imperfections or externalities play a peripheral role in conventional economic analysis, they are at the center of analysis in both the industrial policy and new trade theory literature. As noted earlier, a starting point in both literatures is that economies contain "strategic" activities where capital and labor earn a higher return than they otherwise would or which generate special benefits for the rest of the economy (Krugman, 1986, p. 14). The real debate is over how widespread and important such strategic activities are. If one believes that competition rapidly eliminates large intersectoral differences in the earnings of equivalent qualities of labor or capital and that market prices are good indicators of social return, then there are few strategic activities that can benefit from market-promoting policies. If instead, one believes that there are persistent and large deviations in factor returns between different sectors and that prices are not often good indicators of social return because of spillover effects between individual sectors and the rest of the economy, then the scope for beneficial market-promoting policies can be quite broad.

An examination of Japanese industrial policy suggests that the latter perspective motivated policy. For example, in the 1950s and the 1960s steel and shipbuilding were promoted because they were believed to provide substantial spillover benefits in the form of infrastructure for other

industries. Proponents of this view argue that Japanese success in other industries, such as autos and machine tools, was based in part on the access to cheaper, higher quality steel and on cheaper access to imported raw materials. From this perspective, an evaluation of the wisdom of targetting steel and shipbuilding in the earlier phase of development requires an assessment of spillover effects of this type on other sectors at a later phase of development.

From a traditional economic perspective, the spillover effects provided by the steel and shipbuilding industries are "pecuniary" in the sense that they are reflected in lower input prices to their downstream users. Because pecuniary externalities are reflected in market prices, there is no need for government policy -- markets left to themselves will provide the optimal amount of investment and production. This condition holds, however, only as long as there are no "imperfections" in product markets and no "distortions" in capital markets. The traditional economic assumption overlooks possible imperfections in product markets and "distortions" in capital markets, reflecting difficulties involved in raising significant amounts of private capital to finance large, irreversible, non-marginal projects whose returns are both ex ante unknowable given the existing economic structure and recoverable only over the long run. Once these real world conditions are recognized as facts of economic life, the Japanese rationale for targetting critical input industries appears more compelling.

Take, for example, the case of the Japanese steel industry in the 1950s. Because steel was an important intermediate input produced with economies of scale, policies to promote rapid expansion of high-quality domestic steel resulted in lower prices and reduced costs for steel-using industries. This

encouraged the expansion of these industries which in turn fed back into further expansion of the steel industry and still lower costs. This virtuous interdependence between the steel industry and downstream users gave rise to a true externality -- private increasing returns in the steel industry resulting in social increasing returns in the downstream user industries. Krugman (1985b) has recently coined the phrase "linkage externality" to apply to this type of spillover effect resulting from increasing returns in the production of inputs and their effects on the costs of downstream producers. It is this type of notion that underlies arguments in favor of policies to promote infrastructure in the usual sense of transportation and communication networks.

In the Japanese case, infrastructure was and continues to be more broadly defined to encompass industries whose outputs are not geographically restricted, as national transportation and communications networks are, but which are tradable. For such products, the standard economic presumption is that there is no need for a national industry policy: domestic users of freely tradable inputs will benefit from linkage externalities in the world markets for these inputs. Thus Japan did not need to promote its own steel industry, as long as user industries in Japan could obtain steel from foreign suppliers whose costs and prices would fall as the demand from these industries expanded. Since the world steel industry in the 1950s and 1960s could hardly be called competitive, and since restrictive state policies on domestic steel production throughout the world hindered the free flow of steel products across national frontiers, the Japanese targetting of its domestic steel industry cannot be dismissed as a policy mistake on theoretical grounds alone. Instead, detailed empirical work is required of a kind that is very

difficult to do and that neither the skeptics nor the believers in the wisdom of Japanese industrial policy have tried to do. Thus the question about the wisdom of Japan's market-promoting industrial policy in this industry remains an open one and one whose answer depends not on theoretical assertions but on the market realities of the time.

In recent years, Japanese market-promoting policies have concentrated on high-technology sectors, such as semiconductors, computers and telecommunications. The Japanese view these industries, like steel and shipbuilding in the past, as providing infrastructure on which the future competitive success of a variety of sectors depends. A policy of promoting R&D, investment and growth in these new "infrastructural" activities is viewed as generating beneficial effects throughout the economy. As the arguments above make clear, these industries certainly satisfy some of the conditions required for a linkage-externality argument for market-promoting policies. Seen from a narrow perspective, they provide inputs for production throughout a broad spectrum of the economy, and they enjoy both dynamic and static increasing returns. Indeed, increasing returns have been nothing short of spectacular in semiconductor production in the last decade, with spillover effects on increasing returns in related computer and telecommunications equipment. Private increasing returns in this complex of industries, in turn, are the basis for social increasing returns throughout the economy, as the standard linkage-externality argument suggests.

Seen from a broad perspective, this group of industries provides the foundation for a fundamental revolution in production and communications technologies that is transforming how work is done and how life is lived. The spillover effects of this revolution are likely to be so profound and so

widespread that any attempt to define them precisely, much less to quantify them, at this point in time is an exercise in false formalism. What seems certain is that such industries are "strategic" in the sense of providing both linkage-externalities and more traditional technological externalities in the form of spillover effects from R&D and innovation throughout the economy. For want of a better term, they may be called "strategic-transformative" industries because of the transformation in production technologies and organization which they foster.

Even if one discounts the linkage-externalities and transformative effects of these high-technology industries -- a position which is misguided in its shortsightedness -- standard externality arguments about the returns to R&D and innovation provide a traditional case for market-promoting policies. Economists generally focus externality arguments of this variety on the issue of appropriability. As long as the returns to innovation and R&D are appropriable, there is no divergence between private returns and social returns and hence no rationale for policy intervention. In the context of discussions about national industrial policy and high-tech industries, the issue of appropriability can be better understood by examining different kinds of knowledge generated by R&D and innovation. Krugman (1985b) has distinguished three kinds of knowledge, all of which are present in the high-tech electronic industries: knowledge, such as production process knowledge reflected in firm-specific learning curves, that can be internalized within a firm; knowledge, such as knowledge of product design that can be reverse engineered, which, once generated, is available internationally; and knowledge which spreads beyond the firm but not necessarily easily beyond national or sometimes even regional boundaries. This third kind of knowledge

seems to be the reason behind the development of geographically concentrated "high-technology" centers, with information embodied in people and spread through social and academic networks rather than mediated through the price system.

The economic literature on innovation and diffusion has focused on the second kind of knowledge -- knowledge that is only partly appropriable by the innovating firm. For such knowledge, the evidence suggests overwhelmingly that the social returns to R&D and innovation are significantly greater than the private returns, and this is the most widely accepted rationale among economists for government support for R&D. The argument is particularly powerful for basic R&D, which by its nature is likely to generate knowledge whose benefits extend widely beyond the innovating firm.

Until recently discussions of the spillover effects of R&D did not address the issue of the geographical concentration or dispersion of knowledge. Recently, however, both because of the apparent tendency of high-technology firms to cluster together in distinct communities and because of concern about the extent and pace at which technological knowledge diffuses across national boundaries, the issue has received considerable attention. Of particular interest to the question of how policy creates national advantage in trade is the idea that government support for R&D and innovation helps to create a national pool of innovative talent. The history of technological change in a variety of industries and nations indicates that technological change both supports and is supported by the creation of an ability to innovate embodied in a pool of specialized knowledge and in a specialized labor force. By its nature, this ability is not easily contained within firms or sectors but is much more easily contained within national

boundaries. A nation which promotes R&D and investment in its high-tech industries is encouraging the development of a highly skilled pool of innovative talent, which in the long run, given the mobility of goods, technology and capital across national borders, may be the single most important factor on which national competitive advantage rests.

Although standard economic arguments about the spillover effects of R&D focus on the issue of appropriability of returns, the literature on innovation suggests another rationale for government policy. Scholars of the R&D process often emphasize the systemic nature of many important innovations. In contrast to a stand-alone or autonomous innovation which can be introduced without modifying other components or products, a systemic innovation may not only permit but may require significant modification in other components or products. When an innovation is systemic, the speed of innovation and diffusion depends on the degree of coordination among interdependent actors each of whom faces significant risk acting alone. Systemic innovations require the kind of coordinated information flows and investment plans that are not fostered by arms-length, price-mediated relationships among firms but by stronger forms of organizational linkage, such as vertical integration. From a national perspective, this suggests that government policies to promote the flow of technological and R&D information among firms or to promote the coordination of investment and R&D activities can speed the innovation and diffusion process. This is an important rationale for a variety of Japanese promotional policies, such as programs aimed at joint development of generic technologies in the semiconductor and computer industries.

A general lesson suggested by this line of analysis is that there is no natural pace of innovation and diffusion in an industry or in a nation.

of the uncertainty and risk surrounding these activities and the non appropriability of the returns involved, performance depends not only on a variety of institutional factors, including government policy, firm and market structure, the links between business and higher education, and the availability of different kinds of finance. These are the factors that are traditionally overlooked in much of economic theory but to overlook them at the level of policy formation is to overlook the possibility that political and institutional reform can have a powerful effect on competitive success in research-intensive activities.

Finally, if high technology industries are strategic because of their scale and knowledge externalities, they are also strategic in the sense that they are characterized by imperfect competition. By any common measure of market structure, most segments of the semiconductor, computer and telecommunications equipment industry are best characterized as dynamic oligopolies.¹⁹ A variety of characteristics, including significant learning economies and the advantages they yield to early entrants, product obsolescence based on changing technological positions and changing product requirements, the importance of marketing-distribution channels to market penetration, and implicit or explicit preferential or protectionist treatment of domestic producers in many national environments, most notably the United States, cause these industries to diverge sharply from the competitive model.

From the point of view of U.S. firms and U.S. policymakers, the integrated nature of these industries, the vertical linkages among them, and the government's role in coordinating joint activities among them in Japan are of particular concern.²⁰ The Japanese computer industry consists of

three large firms (Fujitsu, NEC and Hitachi) which are also three of Japan's four largest semiconductor producers. These same firms control more than two-thirds of all telecommunications equipment production in Japan and dominate domestic and global markets in many consumer electronics items. They are also tightly linked to the largest Japanese producers of semiconductor capital equipment (Ferguson, 1986). Given this market structure, it is reasonable to conclude that even in the absence of promotional policy measures, U.S. firms as sellers would face significant barriers to market entry in Japan and U.S. firms as buyers would be unable to purchase frontier technology inputs from Japanese producers to compete with the same producers in downstream, higher value-added product markets. Both conclusions are consistent with BRIE's case study results on U.S.-Japanese competition in semiconductors and telecommunications and both are supported by other case-study evidence.²¹ Of course, BRIE research and related works also reveal an important role for promotional-protectionist policies ranging from the consumer-electronics industry in the 1960s through the semiconductor and computer industries in the 1970s and 1980s in creating the competitive advantage of Japanese firms in both Japanese and world markets.²²

The constellation of arguments indicating the "strategic-transformative" nature of high-technology industries provides a powerful *prima facie* case in support of market-promoting policies of the Japanese variety. The evidence suggesting that the competitive strength of Japanese producers in these industries has been bolstered by these policies to the disadvantage of U.S. producers indicates that this case should be treated seriously in U.S. policy discussions of whether and how the U.S. should respond. It is not enough to argue glibly that closure of the Japanese market to U.S. firms simply worsens

consumer welfare in Japan or that Japanese promotional policies simply lower prices to U.S. consumers, with a net welfare gain for us. These policy prescriptions apply only in a static, perfectly competitive world without adjustment costs and without externalities, a world which does not fit the high-technology industries. As both the new trade theory and the case study evidence documented by BRIE and other research groups indicate, the correct policy prescription is much less certain -- it all depends on many factors, including the nature and size of the market externalities and imperfections involved and the kinds of policy measures considered. It is time that these issues rather than the traditional theory or ideology of perfectly competitive markets inform U.S. policy and U.S. analysis of the policy choices of our major trading partners.

3. Creating Advantage in the New Technological Environment

The previous sections of this paper have argued that the U.S. has a competitiveness problem in international trade and that government policies both at home and abroad shape the dynamics of international competition and hence will play an important role in the resolution of this problem. Looking to the past for evidence to support these arguments, however, runs the risk of blinding the observer to ongoing changes in technology that will have a revolutionary impact on the dynamics of international competition and on the efficacy of different national policies for creating advantage.

Research on new computer-aided production and communication technologies delineate a fundamental revolution that is providing the foundation for greater global interdependence. The new telecommunications technologies underlie the increasing integration of world capital markets that has weakened the links between trade flows and exchange rates. The new production and telecommunications technologies together permit much greater decentralization of production and distribution facilities across national boundaries. The flexibilities of the new production technologies²³ reduce the costs of product variety thereby permitting profitable product differentiation for national, regional, and even local tastes. As a result, firms are better able to produce for a wide variety of different markets around the world, and non-price competition based on product differentiation is likely to increase in importance. The new telecommunications technologies which can provide up-to-date information on inventory, sales, and demand trends in different markets around the world are a necessary component of production and sales strategies based on product differentiation for local markets. Globally, the results are likely to be an increase in trade flows, as greater product

variety becomes an even larger impetus to trade, and greater market segmentation in the sense that firms make distinct output and price decisions for different markets around the world.

The new technologies have implications not only for the output and marketing strategies firms choose but also for their decisions about where to locate production facilities. Jobs that previously had to be located close to one another can now be widely scattered throughout the world. Thus the new technologies have hastened both the automation of labor-intensive jobs from these countries and the migration of many low-wage, low-skill jobs within these developed countries to the developing world.

In the new technological environment, the production location decisions of large multinational companies that account for a large share of world trade flows are increasingly driven by considerations of labor costs and government policies in different countries. From a national perspective, with physical capital and the technology embodied in it more mobile across national boundaries, competitiveness in world markets depends increasingly on the price, productivity and skills of labor and on government policies that affect the relative attractiveness of locating production facilities in a particular country. In this global environment, the scope for potential conflicts between the profit objectives of multinational companies and the production, employment and trade objectives of national governments is even greater than it was in the past.

The greater international mobility of capital and technology and the decentralization of production it entails require a rethinking of the forces underlying national trading patterns. In a world where labor is the only immobile factor of production, standard theories of comparative advantage are

not relevant. In a world where the newest process or product technology diffuses rapidly across national borders, often as a result of the global production strategies of multinational firms, the standard product-cycle theory of trade must also be re-examined. In such a world, the ability of an innovator to capture the returns to a new product or process depends not simply on being the first to market but on remaining competitive in international markets as the innovation diffuses to other producers and locations throughout the world. At a national level, the implications of these trends are clear: maintaining or strengthening a competitive advantage based on technological innovation will be an insufficient foundation for continued growth in national income and for maintaining a sustainable international trade position. Without a "complementary" competitive advantage in related manufacturing capabilities, innovating countries stand to lose a large share of the commercial returns to their research efforts to other countries with superior manufacturing performance (Tece, 1986).

To date neither the industrial policy literature nor the new trade theory literature has focused much attention on the implications of the new technologies for trade theory and trade policy. Yet, just as these technologies are slowly but surely revolutionizing the output, marketing, production and location strategies of firms, so they will change the way contributors to both schools of thought think about trade issues in the future. Change will also be required at the level of policy analysis and design. Many policies that worked to create advantage under older technology conditions will be rendered much less effective under the newer ones. Just as floating exchange rates produced unexpected levels of volatility under conditions of growing capital market integration facilitated by new

communications technology, so national protectionist or promotional policies may produce unexpected distributions of welfare gains under conditions of growing production dispersion facilitated by new production technologies. In the future, the astute policy maker, like the astute producer or consumer, will have to have a firm grasp of the changing technological environment in which he lives.

4. Conclusions

The U.S. economy confronts a crisis in its international competitive position. The staggering trade deficits of the last several years and the foreign borrowing that has financed them cannot be sustained over the long run. At some point during the next few years, the U.S. trade position will have to adjust dramatically, with profound consequences for the level and composition of production and employment at home and abroad. Both domestic and foreign policy makers will have to grapple with ways to improve U.S. export performance and to reduce U.S. import dependence. Admittedly, macroeconomic policy choices will play a critical role in these adjustments, as they did in the spectacular erosion in the U.S. trade deficit after 1982. Given the magnitude of the adjustment required and the underlying longer-term weaknesses in U.S. productivity performance, reliance on macroeconomic policy alone will prove risky. Reliance on exchange rate corrections, with or without a deceleration in U.S. growth rates compared to growth rates abroad, runs the risk of higher inflation rates, recessionary conditions, or more likely a combination of both, in the U.S. and in the rest of the world.

The adjustment process can be made easier by policies to improve the underlying competitiveness of U.S. producers. Higher productivity growth, better quality products, and innovations in product and process technology, like exchange rate adjustments and a recession in domestic demand, can improve the U.S. trade imbalance but with a far lower cost in relative living standards and in foregone output and consumption in the U.S. As the analysis in this paper indicates, the competitiveness of national producers is not a natural endowment -- it is the product of government policy and business decisions. What is needed to make the required adjustment of the U.S. trade

position less costly is the development of a national competitiveness policy. Such a policy would represent the true realization of the supply-side objectives of the late 1970s rather than the distortion of such objectives as a result of the "supply-side" fiscal policies of the last six years.

A national competitiveness policy would entail policies to promote research and development and the diffusion of new technology among user industries, policies to improve the quality and flexibility of the workforce, policies to increase industrial investment, policies to augment export incentives and to offset incentives abroad, policies to open closed foreign markets, and policies to speed the transition of resources from declining firms, sectors or regions to expanding ones. In principle, none of these policies are industrial policies in the sense that they have as their intent underlying goals about the composition of output, although in practice they might be fashioned to realize such goals. Whether industrial policy as defined by such intent is advisable or feasible in the U.S. economic and political environment is an open and extremely important question.

Adjustment of the trade imbalance will result in major shifts in the relative positions of non-tradable and tradable sectors and among tradable sectors themselves. Some of these sectors may be of strategic importance to national economic welfare. Of particular importance are the high technology industries whose international competitive position has been badly damaged for several years as a result of the dollar's overvaluation and the promotional-protectionist features of the Japanese market. Should a national competitiveness policy contain a set of policies specifically designed to restore or promote the international competitiveness of these industries? Are there compelling rationales for temporary protectionist measures in these

sectors that differ from the more easily dismissed rationales offered for protection in other industries such as shoes, apparel and textiles? At the very least, new ideas about the strategic nature of these industries suggest that there are no simple, off-the-cuff answers to these questions. Empirical evidence, specific to the industry in question and to the policy measures proposed, must replace simple theoretical or ideological arguments as a guide to policy formation. Even with this replacement, however, uncertainty about the correct policies will persist because of the market and technological uncertainties that are an endemic feature of the high-technology industries. Because of these uncertainties and because the potential national losses stemming from continued losses in the international competitive position of these industries are large, it might be better to err in the direction of introducing policies when they are not needed than in the direction of overlooking policies when they are.²⁴

FOOTNOTES

1. The analysis in this paper is based mainly on recent research by a group of scholars associated with the Berkeley Roundtable on the International Economy (BRIE). This work is representative of views that are often categorized under the label of industrial policy. Other important contributions to the industrial policy literature include Scott (1985), Cohen et al. (1984), Thurow (1985), Reich (1983), and Scott and Lodge (1985). It is important to note that there are differences among the contributors to this literature, even about the definition of industrial policy and certainly about its desirability in a given set of circumstances.
2. For evidence on these and other indicators of U.S. competitiveness, see Cohen et al. (1984), Thurow (1985) and Scott (1985).
3. Despite evidence of weak productivity performance and weak investment rates, the tax reform adopted in 1986 cut business incentives for investment. There was consensus among most analysts of the bill that it would depress investment and therefore harm the competitiveness of many major U.S. exporting industries in the short to medium run.
4. For example, a recent study by Dornbusch (1985) indicates that as a result of the dollar's appreciation between 1980 and 1984, the prices of manufactured goods produced in the U.S. rose by about 36% compared to the prices of manufactured goods produced by the major trading partners of the U.S.
5. A recent theoretical analysis by Baldwin and Krugman (1986) demonstrates that a temporary rise in the exchange rate, if sufficiently large and sustained, would induce entry by new foreign firms into the domestic market. The entry would shift the subsequent relationship between imports and the exchange rate, so that even if the exchange rate returned to the previous level, the trade pattern would not.
6. For example, Thurow estimates that after an initial depreciation of 38% required to restore balance in U.S. manufactured goods trade (as of January 1985), the dollar would have to fall at a rate of 1.8% per year to maintain balance if the U.S. were to grow at the same rate as the rest of the world. (Thurow, 1985, pp. 98-99.)
7. For evidence on the declining U.S. share in world exports of productive (non-factor) services, see Leontief and Duchin (1985).
8. This evidence is reported in "Family Incomes in Trouble," Briefing Paper, Economic Policy Institute, October 1986.
9. While the entire economy was generating median earnings of \$16,168 in 1983, exports were generating median earnings of \$18,637 and import-competing industries were generating even higher median earnings of \$19,583 (Thurow, 1986).

10. For evidence on several indicators of growing inequality in the U.S., see Thurow (1986) and Bluestone, Harrison and Tilly (1986).
11. For the purposes of the discussion here, we use the term "competitive advantage" to cover the notions of both absolute advantage and relative or comparative advantage. Absolute advantage implies an absolute cost-price advantage over one's competitors and conforms to the notion of competitive advantage used in popular discussions. Comparative advantage is a technical economic term applied to national trading patterns. A nation's products may have an absolute advantage in all sectors, but their advantage will be relatively larger in some sectors than in others compared to their trading partners. According to the theory of comparative advantage, countries will tend to export products in which their comparative advantage is large and to import those in which their comparative advantage is small relative to their trading partners.
12. Static increasing returns arise when an increase in inputs creates a more than proportionate increase in output, while dynamic increasing returns arise when costs fall as cumulative output rises.
13. In economic terminology rents are defined as returns over and above the return that resources would earn in a perfectly competitive market system in equilibrium.
14. In addition to the essays contained in the Krugman book (1986), there are several important contributions to the new trade theory literature including Helpman and Krugman (1985), Brander and Spencer (1981, 1985) and Dixit (1984).
15. The relevant ERIC research includes Zysman, Tyson et al. (March 1984), Borrus, Tyson and Zysman (1986), Borrus, Millstein and Zysman (1983), Borrus et al. (May 1985), and Cohen and Zysman (1987).
16. See, for example, the work of Johnson (1983) and Yamamura (1982, 1986).
17. Caterpillar example in Thurow (1985) p. 81.
18. For more on the decline in trade adjustment assistance during the Reagan years, see Lawrence (1985); for more on "temporary protectionist" policies without quid pro quo, see Yoffie (footwear), Agarwal and Haggard (textiles) and Borrus (steel) in Zysman and Tyson, eds. (1984).
19. Some of the low-cost, labor-intensive product segments of these industries, such as consumer premise telecommunications equipment or home computers, might be better understood as examples of monopolistic competition.
20. For an illuminating discussion of government coordination of Japanese semiconductor firms and of their vertical structure, see Yamamura (1986), Borrus, Tyson and Zysman (1986), and Borrus, Millstein and Zysman (1983).
21. See especially the compelling evidence cited by Ferguson (1986).

22. Yamamura (1986) makes a convincing case that protectionist policies toward television producers in Japan had an important effect on the growing competitiveness of the Japanese semiconductor industry. Baldwin and Krugman (1986) use a simulation model to demonstrate that in the absence of protection of the Japanese market, Japanese producers of semiconductors would have been unable to compete against U.S. producers in world markets.
23. Two kinds of flexibilities are involved in the new production technologies: static flexibility, that is, a single arrangement of equipment can produce a wide variety of products; and dynamic flexibility, that is, rapid change of production process to incorporate product or process innovations can be made without expensive retooling.
24. As Weitzman (1974) pointed out so insightfully several years ago, in a situation of uncertainty about future costs and benefits where failure to produce an adequate output level of a particular product can have large deleterious effects on social welfare, it may be a better strategy to rely on non-market, non-price signals than to depend on market signals alone.

REFERENCES

- Agarwal, Vinod, and Stephen Haggard (1984) "The Politics of Protection in the U.S. Textile and Apparel Industries," in John Zysman and Laura Tyson (eds.) American Industry in International Competition (Cornell University Press).
- Baldwin, Richard and Paul Krugman (1986a) "Market Access and International Competition: A Simulation Study of 16K Random Access Memories," National Bureau of Economic Research, Working Paper No. 1936.
- Baldwin, Richard and Paul Krugman (1986b) "Persistent Trade Effects of Large Exchange Rate Shocks," manuscript, MIT Economics Department.
- Baumol, William J. and Kenneth McLennan (1985) "U.S. Productivity Performance and its Implications," in William J. Baumol and Kenneth McLennan (eds.) Productivity Growth and U.S. Competitiveness (Oxford University Press, New York).
- Bluestone, Barry, Bennett Harrison and Chris Tilly, (1986) "Wage Inequality Takes a Great U-Turn," Challenge, March/April.
- Borras, Michael (1984) "The Politics of Competitive Erosion in the U.S. Steel Industry," in John Zysman and Laura Tyson (eds.) American Industry in International Competition (Cornell University Press).
- , James Millstein and John Zysman (1983) Responses to the Japanese Challenge in High Technology: Innovation, Maturity and U.S.-Japanese Competition in Microelectronics, ERIC Working Paper No. 6.

- , et al. (198) "Telecommunications Development in Comparative Perspective: The New Telecommunications in Europe, Japan and the U.S.," BRIE Working Paper No. 14.
- , Laura Tyson and John Zysman (1986) "Creating Advantage: How Government Policies Shape International Trade in the Semiconductor Industry," in Paul Krugman (ed.) Strategic Trade Policy and the New International Economics, (MIT Press, Cambridge, Mass.).
- Brander, James and Barbara Spencer (1981) "Tariffs and the Extraction of Foreign Monopoly Rents under Potential Entry," Canadian Journal of Economics.
- (1985) "Export Subsidies and International Market Share Rivalry," Journal of International Economics.
- Cohen, Steve, David Teece, Laura Tyson and John Zysman (1984) "Competitiveness," Global Competition: The New Reality, Working Paper of the President's Commission on Industrial Competitiveness, Vol. III.
- , and John Zysman (1987) Manufacturing Matters: The Myth of a Post-Industrial Economy (Basic Books, New York).
- Council of Economic Advisors (1984) Economic Report of the President, (Government Printing Office).
- Dixit, Avinash (1984) "International Trade Policy for Oligopolistic Industries," Economic Journal Conference Papers.
- Dornbusch, Rudiger (1985) "Exchange Rates and Prices," National Bureau of Economic Research Working Paper No. 1769.
- Ferguson, Charles (1985) "Strategic Technologies and Strategic Interactions: Economic Policy in the Face of High Technology Decline," paper prepared for the meetings of the American Political Science Association, Washington, D.C.

- Helpman, Elhanen, and Paul Krugman (1985) Market Structure and Foreign Trade (MIT Press, Cambridge, Mass.).
- Kravis, Irving and Richard Lipsey (1985) "The International Competitiveness of U.S. Firms," paper presented at NBER Annual Research Conference on International Trade.
- Krugman, Paul (1985a) "The U.S. Response to Foreign Industrial Targetting," Brookings Papers on Economic Activity.
- (1985b) "Strategic Sectors and International Competition," paper prepared for conference on U.S. Trade Policies in a Changing World Economy, University of Michigan.
- (1985c) "Comments" on Obstfeld paper, Brookings Papers on Economic Activity, No. 2.
- (1986) "Introduction: New Thinking about Trade Policy," in Paul Krugman (ed.)
- Johnson, Chalmers (1983) MITE and the Japanese Miracle (Stanford University Press)
- Lawrence, Robert (1984) Can America Compete? (Brookings Institution)
- Leontief, Wassily and Faye Duchin (1985) Automation, the Changing Pattern of U.S. Exports and Imports and their Implications for Employment (New York: Institute for Economic Analysis).
- Reich, Robert (1983) The Next American Frontier (Times Books, New York).
- Scott, Bruce R. (1985) "U.S. Competitiveness," in Bruce R. Scott and George C. Lodge (eds.) U.S. Competitiveness in the World Economy (Harvard Business School Press).
- , and George Lodge (1985) U.S. Competitiveness in the World Economy (Harvard Business School Press).

- Stowsky, Jay (1986) "Beating our Flowshares into Double-edged Swords: The Impact of Pentagon Policies on the Commercialization of Advanced Technologies," BRIE Working Paper, University of California.
- Teece, David (1986) "Capturing Value from Technological Innovation: Integration, Strategic Partnering and Licensing Decisions," Center for Research and Management Working Paper (University of California, Berkeley, California).
- Thurow, Lester (1985) The Zero-Sum Solution: Building a World Class American Economy (Simon and Schuster, New York).
- (ed.) (1985) The Management Challenge: Japanese Views (MIT Press, Cambridge, Mass.).
- (1986) "A General Tendency Toward Inequality," American Economics Association, Papers and Proceedings.
- Weitzman, Martin L. (1984) "Prices versus Quantities," Review of Economic Studies.
- Yamamura, Kozo (ed.) (1982) Policy and Trade Issues of the Japanese Economy, (University of Washington Press).
- (1986) "Caveat Emptor: The Industrial Policy of Japan," in Paul Krugman (ed.) ? .
- Yoffre, David (1984) "Adjustment in the Footwear Industry: The Consequences of Orderly Marketing Agreements," in John Zysman and Laura Tyson (eds.) American Industry in International Competition (Cornell University Press).
- Zysman, John, Laura Tyson, et al. (1984) "U.S. and Japanese Trade and Industrial Policies," BRIE Working Paper No. 2.
- (1984) American Industry in International Competition (Cornell University Press).