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# Toward a Policy Agenda for Competitiveness

THE current economic transition—the transformation of industrial society—sets an agenda of change and policy choice. Competitive adjustment, we have argued, will be built on the ability to generate and apply product and process innovation. Competitive advantage will rest not just on product innovation, but on sustained manufacturing expertise. Those economies that diffuse and apply technologies widely will find advantage because they will both create markets for new and advanced technologies and transform traditional industries in the process. But there is nothing inevitable about the outcome. However, the policies we adopt will be an important element in determining the choice we make about the outcome we create.

## Creating Economic Resources

How in an era of transition can government help create advantage? It can do so principally by substantially upgrading the quality of what goes into production, the factors of production—raw materials, capital, labor—and



the networks and rules that affect how those factors are combined—the economic infrastructure. Government must act primarily at the second level of the policy hierarchy (see Chapter 14). Even traditional theory suggests this. Comparative advantage rests on the relative factor proportions required in the production of different types of goods—that is, a nation will tend to specialize in those sectors that require factors of production that it has in abundance.

Classical trade theory does not worry about *how* a nation got its particular pattern of comparative advantage, just what it is. National factor endowments are not, however, simply given by nature; they are, to an extent that matters, created over time by policy. Moreover, policy powerfully affects the real price and quality of these inputs, and does so all the more when the crucial endowments involve technology, know-how, and skills. Let us look at the effect of policy on, respectively, land (raw materials), capital, and labor (which includes technological know-how)—the basic inputs to the economy.

### RAW MATERIALS

The power of policy to create advantage by creating national factor endowments and affecting their quality and price is evident even in the case of raw materials. Geology is a natural given; economics isn't. Policy can play a role—a big role—in transforming geological factors into factors of production. In economics the question is not what raw materials a country can locate beneath its soil, but at what price they can be delivered to the point of use. And delivered price can be massively influenced by policy. One country may have abundant coal or iron or copper in the ground, but since the coal is deeply buried in isolated areas, the cost of getting it to the surface and shipped to the point of use may be very high. A second country may have no iron, coal, or copper, but may have decided to invest massively in port facilities and ships; it may be able to buy the raw materials at prices lower than that of its naturally endowed competitor. Japan, for example, has been blessed by a relatively solid absence of natural resources: no iron, no oil, no copper, though to their regret, the Japanese do have some coal. Japan consciously set out to turn its lack of raw materials to an advantage. It located steel mills on the coast, invested in modern port and off-loading facilities, and innovated in shipping design and production, while at the same time obtaining access to and control of raw materials around the world. The delivered price to Japanese producers of such raw materials as coal, iron ore, and copper has often been at prices lower than that paid by its competitors who have such resources in the

ground. Indeed, Britain and France, as well as other naturally endowed nations, have been compelled by domestic political pressures to maintain high-cost domestic production of coal and other raw materials; their resource endowments have become comparative disadvantages.

Infrastructure development was the key policy choice involved in transforming a geological disadvantage in raw materials into an economic advantage. The provision of infrastructure can be considered a market-perfecting policy; infrastructure improvements make markets work better by eliminating "frictions," in this case—as with ancient Roman and modern American roads and harbors—the frictions of physical distance.

## CAPITAL

If policy, along with lots of effort, can decisively influence even the most "natural" of production factors—raw materials—it can play a bigger role in the other factors—such as capital—which are clearly not a matter of natural endowment. The level of savings, the allocation of access to that pool of savings, and the price of that money to different kinds of users are not simply matters of "natural" market forces. They are strongly affected, sometimes even set, by domestic and international policy decisions.

Sometimes the decisive character of policy is overlooked and people start to believe that capital costs or savings rates lie in our national character, so let us construct some illustrative examples of policies that have enormous impact. Let us make the market for savings competitive by eliminating traditional ceilings on interest paid to small savers; open the market to all borrowers, worldwide; allow interest payments on housing and consumer goods to be deducted from income for tax purposes; and create a social security system whose benefits are not based on actual past savings but on entitlements funded from current taxes. If we follow these policies, the cost of funds will rise. This is clearly the American case. Now let us choose a different set of policies. Let us fund pensions entirely from the earnings of past savings; administer the flow of funds to limit and to discourage consumer credit, which will not be granted tax advantages; keep a lid on interest paid to small savers; and moreover, limit foreign access to the pool of domestic savings thus generated. This is clearly the Japanese case (at least up through the mid-eighties). Other things being equal, as the economists say, savings will be higher in Japan, the pool of savings more readily available to national industrial investment, and crucially, the costs of capital will be lower in Japan than in the United States.

Our choice on capital costs—keeping America's higher than that of our most powerful competitor—has substantial consequences. Since Japanese capital costs are lower than ours, Japanese firms will have an advantage in capital-intensive businesses and an incentive to convert competition into a game of capital-intensive manufacturing, something they have done, with disproportionate benefit to themselves in industry after industry, most recently in semiconductors. In this way the nature of competition is itself shaped by policy, ours and that of other governments. A big difference, however, is that, for the most part, our policies are being set with little concern for competitiveness while those of our most successful competitors are being strategically determined.



Not only do the differences between American policies for capital and those of other countries matter, but it is no longer possible to just have a domestic policy for savings and investment. We must make the policy with attention to international markets and do so strategically, with an eye to foreign government policies. International markets and the strategic logic of policy now make even seemingly simple and direct solutions into complex conundrums. It may prove more difficult than expected to gain or close a cost-of-capital disadvantage. Take the deficit. Can it be assumed that slashing it would lower the competitive disadvantage of U.S. firms in capital costs? The answer must be: only maybe. First, a reduction in U.S. government borrowings should relieve demand pressure on capital markets. Interest rates should then decline. But there is no reason to assume that foreign governments would not take advantage of that reduction to lower their interest rates and thereby negate any catching up on the costs of capital. Also, and more important, if world capital markets were indeed open—and the U.S. market is, for both borrowers and lenders—there is no reason to assume that U.S. savings, even if lent at lower prices, would be channeled into onshore U.S. productive investments; they could go, as they have in the past, to finance French nuclear power plants, or Korean semiconductor factories, or nonproductive spending in Latin America, or to finance American spending on housing and on imported goods. This is not to say, "Don't slash the deficit." It will have a big and positive impact on U.S. industry. But that impact might well come less through lowering the relative costs of capital to U.S. industry than through lowering the exchange rate of the dollar. The point is that the impacts are strategically determined; the effects of our move will depend upon the responses of policy makers in other nations.

If international capital markets were truly open, it wouldn't necessarily matter where the savings took place. American, Swedish, and Dutch firms could draw on Japanese savings at those same low rates of interest Japanese firms enjoy. However, in the Japanese case, policy has prevented this. Foreigners who might have wanted to draw on the Japanese national

pool of savings have, until now, had only limited access. That capital cost differentials have been an important element in international competition in recent years is largely the result of a Japanese policy choice. The policies were originally established to generate capital in postwar Japan, when investment funds were short. They have simply never been dismantled. In an international economist's dream world, perhaps the whole question for America and for others could be mooted by eliminating the possibility of substantial international capital cost differentials. In recent years there has been much movement in opening capital markets—though many of the capital markets in the advanced countries, especially Japan, the biggest after the United States, are far from open. In a world of open capital markets—that is, in a single world capital market—in which there were no successful national policies to favor certain sectors in the pricing and allocation of capital, competitive advantage in capital-intensive production—long a U.S. strength and now a weakness—would be hard for anyone to achieve. Capital cost differentials—and policies designed to foster them—would cease to be a strategic concern of government and would drop out of the international competitiveness equation. It would be a solution to the policy problem in that it would simply eliminate it. In fact, international capital markets are already open enough, large enough, and efficient enough that the advanced countries will not be able to build capital barriers to entry against new producers.

If the prices and availabilities of raw materials, as well as the costs and availabilities of capital become smaller and smaller factors in differentiating production possibilities and costs across nations, the burden of competitiveness will fall on much softer factors of production: the ability to generate and use the most advanced technologies, the intelligence and dutifulness of the work force, and the relative ability of organizations to combine smart and flexible technology with smart and flexible people. The level of skill—perhaps education or productive smarts are better words—and the flexibility, robustness, and astuteness with which that intelligence is organized and mobilized will become the critical differentiating factor. This leads us to technology and education.

## TECHNOLOGY

Technological development and diffusion, we have suggested, is where advanced countries may be able to gain an edge and establish themselves during the transition. Importantly, this is an area in which it is widely accepted that markets often fail, and because of that it is an area where government policy can make a major difference to competitiveness.



The root of market failure is to be found in the fact that the social gains from technological investment and use often exceed even the enormous private gains. Since the socially optimal amount of effort will not occur spontaneously through markets, government support is considered appropriate to capture these externalities. There are an abundance of historic policies in America and in countries around the world aimed at making the markets for technologies work more effectively, or at least more effectively for them. In Japan the government adopted strategies in advanced electronics and manufacturing to encourage technological development in Japanese firms by funding what we call "generic" technology, thereby lowering the risk to firms entering new technological arenas. It has adopted ambitious policies to diffuse NC machine tools and robots among small producers who would otherwise be reluctant and slow to adopt these new apparatuses. In the United States the famed agricultural extension service and the land grant colleges were organized to develop and diffuse agricultural technology and upgrade skills in the agricultural sector. They were, as these things go, extraordinarily successful policies. In all these cases governments have acted, in the language of economics, to correct market failures. The improved use of labor and capital embedded in new technology gives advantages to firms that accumulate national comparative advantage in the high-value-added sectors.

For the development and, critically, the diffusion of today's production technologies, America currently has created two major disadvantages for itself. First, the American investment in civilian technologies now lags behind that of its partners. Civilian spin-offs from military R&D could, of course, offset some of that disadvantage. But studies at BRIE and elsewhere suggest that these commercial advantages are now much more restricted than they were in the 1950s and early 1960s.[1] While it is difficult to judge the effect of military development and procurement on civilian industry, on balance the impact is, in our view, to distort the capacity of firms to adjust to competitive international markets. To promote civilian R&D, government can do a number of things. It can subsidize, directly or through taxes, firms that undertake or increase levels of R&D. The R&D tax shelters and tax credits are instances of such policies. Government can also support the basic scientific research and the education required to transform basic science into products. Policy can promote more applied research. Here, often, there is a concern that government will either support the wrong firms or the wrong technologies. There are ways of avoiding that problem.

In critical areas such as semiconductors or new materials, support for generic technological development is a means of addressing international

competitive problems. In current American policy there is a category called "basic science," which is heavily funded in the United States. Pour money into the science machine, the theory goes, and out will come product and economic growth. Of course the Japanese did fine without pouring much in at that point. They borrowed the results of that basic research from elsewhere, usually the U.S., at no or very low cost. There is a second category called "product development." In between basic science and product development is a third category known as "applied science"—the application of basic principles to something useful. In fact, policy makers need to examine these categories more carefully. At any moment a range of products will depend on resolving particular scientific problems or building up enough knowledge about particular materials or processes. Those problems are not basic science, but they precede product development. In the sweep of applied technologies and science, certain problems can be identified that are likely to have substantial economic consequences if solved. Here is where the Japanese have put their money.[2] It is the generic quality of these technologies, which are essential to many products but not specific to any, that permits joint research corporations among competing firms such as Microelectronics and Computer Technology Corporation to be established. In passing we should note that Bell Laboratories once played this role with extraordinary distinction. It was a national treasure and resource, a center of research that solved many generic problems and pumped the results into the national and, indeed, the international industrial community. The AT&T divestiture, the breakup of the Bell System, has changed the nature of Bell Laboratories' role in the economy. Generic research is a suitable and underdeveloped target of competitiveness policy.

Second, there is the task of diffusing the use of emerging technologies. In the nineteenth century American policy took the lead in this area when we established the Agricultural Extension Service both to do research for farmers, none of whom could individually conduct that research, and to diffuse this advanced agricultural know-how. That policy had a strong and positive impact on raising the competitiveness of American high-income agriculture. In the twentieth century the Japanese have created a virtual manufacturing and machine-tool extension service.[3] It does for a broad range of industry what the Agricultural Extension Service did for American farmers, introducing them to new ideas and equipment and providing technical expertise to help them choose and use that equipment productively. Japanese policy has gone even further. It has organized programs to help small and medium-sized firms lease and purchase the advanced equipment vital for increasing their competitiveness and, therefore, the



competitiveness of other Japanese firms linked to them. These policies have helped Japan diffuse NC machine tools and robots among smaller producers, who would ordinarily be slow to adopt new techniques, much faster and more broadly than in the United States. A Manufacturing Extension Service, patterned after the Agricultural Extension Service, would be a good device for bringing new technologies into smaller U.S. firms. It would help U.S. competitiveness across a range of industries, not just those that make the technologies. With a similar objective of diffusing technology, but at a much higher technical level, the National Science Foundation is purchasing a number of supercomputers for major U.S. universities to train the next generation of computer scientists on the newest, albeit very expensive, machines rather than on outdated technologies. Technological diffusion is critical because the current industrial transition is being driven by the application of emerging transformative technologies to traditional sectors. When microelectronics, new materials, and biotechnology touch established products, those established products, as well as the processes to make them, are altered. Moreover, the new technologies interconnect, creating an economywide wave of advance.

There are now extensive international markets in technology. Just as international capital markets have made investment funds more widely available, technology, which diffuses ever more rapidly, is more quickly available to more potential producers. Consequently, the way technology is employed will prove decisive. That will turn, in our view, on the character of the U.S. work force. Technology will be a complement not an alternative to a skilled work force.

## EDUCATION AND SMARTS

In the present transition, the nature of work-force skills and the level of those skills will change. However, the distant and disembodied force of technological development driven by competitive pressures will not unilaterally determine the kinds and number of skills that a competitive U.S. economy will require. Skill requirements—the market's demands for labor—will be significantly shaped by skill availabilities, and not only in the static and conventional sense of markets always clearing at some price. Work at BRIE suggests the hypothesis that the availability (or scarcity) of skills shapes competitive strategies as well as the development of particular technologies.[4] This has always been the case:

We can see it as far back in the American past as in the origins of mass production of muskets, an organizational and technological re-

sponse to perceived shortages of craft skills. Former Labor Secretary Ray Marshall has observed a similar phenomena in the period after World War II. He argues that the GI Bill played a key role in creating a supply of well educated workers that shaped a demand for their skills. A similar adjustment to skill availability also occurred during the 1960s when highly trained solid state electronics engineers—the result of government grants to graduate engineering education during the 1950s—began to enter the labor force in significant numbers. Educated labor is an economic resource that is strongly shaped by policy. In this transition it may prove decisive. We should admit that our close work with the Carnegie Forum on Education and the Economy during the last year simply confirmed our own biases. Nonetheless it does appear that "organized smarts" will massively determine a nation's competitive success in the current transition. An educated, skilled labor force broadens rather than forecloses choice in the competitive development and application of technologies. In the end it permits firms to get new technology into place more cheaply.

Similarly our research and the work of others suggests that across the industrial spectrum, competitive mastery of the new technologies rests on successful employment of workers' skills. In continuous processing plants, for example, microprocessor based instrumentation generates a large integrated data base. To maximize the power of the technology, workers have to be able to monitor, analyze, and intervene in the continual flow of electronic data; they have to "both theoretically apprehend the data and convert their understanding into articulate processes in order to communicate it to others." Similarly metal workers using computer-controlled machine tools need to rely on a reservoir of craft skills to prevent disastrous breakdowns and bottlenecks in the production process. In white collar industries the introduction of office automation technologies makes it possible for clerical workers to assume functions formerly reserved for professionals, but only if they are sufficiently skilled to use the new technology and sufficiently educated to understand the new functions. Even the speed of change itself places new demands on the work force, requiring that it adapt continually to new products and new processes.[5]

Labor as a factor of production is not just people, but people with particular skills, attitudes, and habits. Production can be organized differently with literate workers than it can in an illiterate community, to take just one element of the labor package. The skill base of a nation and how it is employed is likely to be the decisive factor in determining national competitiveness—the country's ranking in the international hierarchy of wealth and power. America has a rather substantial range for choice in this



matter. The pool of skills is a product of education policy. In the nineteenth century America benefited from a uniquely egalitarian system of public education that produced an unusually broadly skilled work force. At one time America could be confident that, in competition with Europe, its egalitarian, literate, and homogeneous community of skilled workers represented a distinctive asset. We cannot have such confidence now. We have lost that advantage. American literacy rates are low: functional illiteracy of U.S. seventeen-year-olds is estimated to be somewhere between 8 and 20 percent.[6] Some estimates are radically higher. Less than one percent of the Japanese population[7] is functionally illiterate. On the basis of internationally administered achievement tests, American high school seniors do very poorly in international achievement comparisons—worse than the students of any other developed nation.[8] The number of engineers per capita in Japan is roughly double that of the United States.[9] Unless we avert this, the United States will find itself with one of the lowest skilled work forces among the advanced countries, and this will directly and powerfully shape our pattern of advantage, converting it to a pattern of disadvantage in industries that can employ high-wage labor.

Unless we have the skills to employ the new production possibilities, no amount of investment capital will make us competitive with countries that have invested in human as well as in physical capital. Economic development and productivity in Japan and the newly industrializing countries rests firmly on their development of a skilled work force. The unexpected and impressive success of Korea in advanced electronics is an excellent illustration of creating advantage through factor policies, especially skills policy. That nation entered electronics with none of the three necessary elements: it had no supply of skilled electronics engineers or technicians, little capital, and no homegrown technology. It sent its promising young people off to MIT and Berkeley, borrowed the money, licensed the technology, and built, over the years, an emerging and probably self-regenerating comparative advantage in electronics. An explicit policy about skills and an all-out effort to develop them was an indispensable element in Korea's success in electronics. It is not just that their labor was cheap, but that it was disciplined and—for the production tasks needed—educated and skilled. Now, as our competitors, both the newly industrializing countries and the advanced economies of Europe and Japan, move into higher and higher value-added production, the educational levels of their work forces and the investment in education at all levels of their societies are increasing more than proportionally. The United States will not again be the economy with the most skilled work force. The question is whether we will find ourselves at a substantial disadvantage.

Equally important, the skill pool of the population shapes how tech-

nology is used. Firms in different countries use different production technologies; cars are made differently in Britain, Japan, and the United States.[10] The origins of those differences do not lie, as we saw, simply in the cost of different factors of production. Rather they reflect different approaches to the problems of manufacturing—different solutions to be found under different social conditions and in which labor and capital costs are merely one element. Indeed, there are many instances in which factories in different countries use identical machines in radically different ways and achieve distinctly different results in terms of productivity.

Certainly, until five years ago the debate over how robots should be used was on different tracks in the United States and Japan, with the Japanese emphasizing production flexibility and the Americans emphasizing labor replacement.[11] There are clues emerging, not systematic evidence but clues, that the consequences of the new competition and technology for the labor force depends on how it is used. How the technology is used depends on the problems it is called on to solve. If there is a shortage of skilled labor, then the technologies will evolve in ways that require less skilled labor. Where skilled labor is abundant, technology can emerge to reinforce the abilities of the work force.

In the formulation we have chosen—seeing the economy through factors of production—skills appear as the most important element of policy affecting labor. Yet, if the optic is shifted slightly, it is the organization of labor relations and the character of labor-management conflict that will shape the technological strategies of firms. Where skilled labor is absent but technological development is easy to attain, technology will be used to substitute for the missing labor. However, where skilled labor is abundant but powerful and perceived by management as an obstacle to corporate operations, the technology will be used to displace the work force and eliminate the obstacle—the power a skilled work force can exert over operations in plant and shop floor. The technology will be used to eliminate perceived obstacles to management strategies and autonomy. Consequently, labor relations are a vital counterpart to work-force skills. This is not a technical matter of the best way to arrange "bargaining" and negotiations. Rather, it is a matter of resolving the conflicts between labor and management in a manner that assures flexibility and encourages participation and cooperation. In one form or another this involves security of employment. The politics of labor is the vital counterpart to the politics of education.

America has substantial choice here. We could try a strategy of stripping skills out of jobs. We can try to replace skilled labor—on the shop floor and in the office—with technology and offshore that which we can't



replace or think we can't yet replace. As argued in Part II of this book, how the technology is to be developed and how it will be used is not determined. It is a question of choice or, more accurately, a question that will be resolved by a long series of iterative choices, each one being influenced by the previous one.

Shaping and using technologies to displace skilled labor runs deep and serious national risks. At any single moment it may be possible for a firm to pursue this tactic, but it will start us down a dangerous technological path, one that in the long run will make national competitiveness in world markets difficult. There are three dangers or risks. First, we suspect that technologies that displace skilled workers are more rigid and less flexible than those that complement and require skills. Such production systems are inherently more capital-intensive. They generally require far higher levels of capital investment and technological complexity to achieve comparable results. In part, as a consequence of the greater investment of capital and the elimination of skills, entire production systems must be reformed from the top down in larger discreet steps. They are more difficult to reform from within. This simply reinforces a weakness of American firms—their inability to adapt rapidly to changing technologies. Second, worker replacement technologies are harder to develop and more expensive to implement. Take, for instance, artificial intelligence control systems for production. If they are used to supplement worker skills, they can be much simpler than if they must embody vast levels of expertise and knowledge required to replace the workers. Look at the Bay Area Rapid Transit system (BART) in San Francisco. The technological dream was to replace drivers with an automated control system. To do so required enormous development costs and heavy capital investment. Yet, that system has never worked. In sum, simpler technologies that rest on worker skills will be implemented sooner and be more widely diffused, we hypothesize, because they are easier to develop and cheaper. But, we must not exaggerate. Fully automated factories will emerge and do provide remarkable efficiencies. Yet the question, we suspect, is how one closes on the design of such "lights out" operations. If the automated factory implements production systems initially developed progressively with skilled labor and less automated technologies, they are likely to move into operation smoothly and effectively. When the design is conceived whole cloth by engineers and cast into concrete and machines, serious difficulties may be expected. In other words, skilled labor may be a decisive element in the experimentation required to develop new production systems. Third, and centrally, can we as a nation—as opposed to an individual firm or even the sum of individual firms—really adopt fundamental strategies based on

stripping labor skills from jobs and, therefore, accepting a relative decline in overall educational levels?

To pose the question as a national choice raises some unpleasant fundamentals about the different strategies that can be used to contend with our competitiveness problem. For the nation, the low-skill choice leads to dead ends. Competition on wage rates is one dead end. We cannot, we are learning, keep capital costs substantially lower in America than abroad, so that American unskilled labor could command much higher wages than foreign unskilled labor because it could be given much more powerful tools with which to work. It is also a fantasy to hope that an elite group of American engineers can keep production technology in this country so far ahead of technology in other advanced countries and developing nations that we can retain decisive production or product advantage. The realities of the past few years should by now have shattered that illusion.

That America will lose if it takes the low-skill route does not mean that America will close down or that all Americans will lose. It does, however, mean that most of us will lose a lot, and that this country will be transformed in ways that many of us find terribly unattractive. We would become more like a Latin American society. We could have a small minority of high-skilled research, development, production, and service jobs coexisting with a majority of low-skilled, low-wage jobs, and massive underemployment and unemployment. For the vast majority of Americans, living standards would deteriorate rapidly—probably along with social equality and political democracy—as, in order to compete, manufacturing and services move offshore and automation strips the remaining labor content from the remaining U.S. goods and services. It is not an attractive scenario.

## THE NEW INFRASTRUCTURE: TELECOMMUNICATIONS AND ORGANIZED SMARTS

Infrastructure, as we have just seen, remains vital, even in its most traditional forms: ports, rails, and roads. But the critical form of infrastructure is now telecommunications. Chapter 11 made this argument and showed how the development of new telecommunications-based technologies and their adaptation in a vast range of commercial settings are radically altering production strategies and recasting the competitive equation.

It also showed how different nations are responding differently to the possibilities of the new telecommunications. Japan, in particular, is making an enormous effort, investing way ahead of market, to provide



the most sophisticated possibilities to the broadest possible range of users—that is, to both small and large businesses (and even households). The United States, on the other hand, has devised policies that focus on providing, at very rapid speed, new and sophisticated technologies primarily to big users. It is, in the final analysis, a policy that conceives of telecommunications as an investment service purchased through the market by firms. And the United States has cleared away the obstacles to letting the market fit the technology to those clients who occupy the biggest places in the launch markets—the big users. The Japanese strategy is differently conceived. It sees telecom primarily as an infrastructure, and the Japanese government is setting the pace and the form of that infrastructural investment in order to orient and improve the working of the market. The improvements they have in mind are clear: get the benefits of the new technology to small-and middle-sized firms as well as big ones so that it will help them to compete in the ever more difficult international competitive environment. That strategy aims at helping not only small Japanese firms but also, because many of them are subcontractors to big firms, at increasing the competitiveness of those large firms. At the same time, by investing ahead of market demand, Japanese infrastructural policy structures and launches what Japanese policy makers consider the most important high-tech sector for the future—enhanced telecommunications—in a way designed to enhance mightily the competitive advantage of Japanese firms.

Infrastructural policy cannot be divorced from competitiveness policy. But telecom, however enhanced, is more than a physical and software network that, once laid in, will quickly give a nation's producers a launch-market lead down the learning curve and, when applied broadly, will offer vital production advantages to that nation's producers. Ultimately, productive use of that infrastructure depends upon the "quality" of the person on the other end of the line. That takes us back to the new economics of educated and organized "smarts," which treats national endowments of trained intelligence as productive infrastructure for the entire economy as well as just assets (actual or potential) for a particular firm.

Put more formally, as the division of labor becomes more and more complex—and that, after all, is what the colossal growth of producer services represents—the productivity of any worker, or any firm, depends on that of workers in other firms. The workers in other firms provide not simply a priced and purchasable input that can be warehoused and used as needed. Instead, they are integrated into the production "on-line" as it were. The telecom revolution is all about enhancing this interactive approach to complex production. The productivity of a doctor, for example,

is substantially a function of the ability of the patient to describe symptoms accurately and quickly and to understand complex instructions the first time through, as well as a function of the productivity of lab technicians, medical-imaging centers, and insurance claims processors, to name but a few. They are all external to the doctor's organization. In still more formal terms, when a firm's production function is written out in mathematical form, the factors that determine output are listed, rather like the ingredients in a cooking recipe: so much capital, so much raw materials, so much labor, and so on. But there is a whole set of factors that are not generally included in the written equation; they remain implicit. One such factor is public order: revolutions that will disrupt production are not listed; power outages that will short-circuit the works are also not factored in. The implicit part is growing bigger, or at least it is changing its composition. As the division of labor extends itself, the production function of any firm—be it a manufacturer or a service firm—is becoming increasingly dependent upon the production function of other firms. If this is not true, we have no explanation for the growth of services to producers that we examined in the first part of this book. It becomes harder and harder to shield or isolate the productivity of your firm from that of other firms—clients as well as providers—and from the organizations upon which your own productivity depends; for example, by buying up all the good people, because your good people have to interact with their less good people. Accountants, lawyers, travel agents, financial advisers, and consultants of all sorts confront similar "interdependent" production functions. So do software writers, venture capitalists, and air traffic controllers. Production more and more resembles an on-line network.

## Should Government Intervene in Specific Sectors?

Sectors are a fact of life. However lowly the place they occupy in economic theory, sectors are where industrial change is experienced and where political pressure for government to act concentrates. As long as there is industrial change, there will be sectoral pressures for government to act; given those pressures, sometimes, perhaps often, government will act, and the target of its actions, explicitly or otherwise, will be the sector. The realistic question is not whether we will or will not have policies at the sectoral level; we have many of them. The issue is whether America will or will not make its policies with attention to the purpose of encouraging positive



adaptation to international competition and whether we will or will not respond to the sectoral policies other nations adopt to create advantage for their firms in international markets.

Sectoral policy is pervasive; and it's not just about competitiveness. Government intervenes on a selective basis all the time. It does so on the sly and with a bad conscience. More importantly, it does so with no strategic aim. Our agricultural policy protects particular groups and forms of productions; our tax policies steered investment into real estate, oil, and farming; our pension policies encourage short-term investment; massive government credit guarantees distort financial markets in specific but scattered directions; and, of course, our defense policies both aid and impede competitiveness in major hunks of the economy. The list of protected industries could be made very long: coastal shipping, trucking, textiles, tobacco, oil, steel, offshore pipes, aeronautics, and many, many others each get their special, sectoral treatment. We do not develop strategic aims in part because we do not want to, in part because we have never had to, in part because we are quite unprepared intellectually, institutionally, and politically to take on the task, and in part because we assume that domestic interventions simply serve to advantage some groups rather than others and that they advance the particular rather than the general interest. Americans do not believe that attention to sectoral problems can translate into general increases in national welfare or affect our international comparative advantage.

Even a modicum of political realism also tells us that there is absolutely no sense paralyzing ourselves in an irresolvable discussion of whether or not to have sectoral policies. The United States already has them, hundreds of them, especially for existing industries that succeed in getting themselves made into objects of positive policy. And we will have many more, soon. What policy makers must do is change them, reorient them in a competitive direction. The fact remains, that despite popular belief, our domestic interventions, for better or worse, do shape our comparative advantage. And so do those of other nations.

The new debate about selective intervention as a policy issue in this country emerges in response to foreign government policies to promote their industries by "targeting," as the policy has come to be popularly labeled. Industrial policy and planning have few firm roots in purely domestic U.S. politics or in American intellectual life. Rather, American industrialists who consider themselves to be in "targeted" sectors focus attention on foreign selective policies when they contend that their foreign competitors are given an "unfair" advantage in international competition through subsidized research and financing often along with protected

home markets. Their complaints are frequently answered in very simplistic, static terms. Those static analyses generally conclude that the foreign government is wasting its money and subsidizing us and that we should take their subsidized goods, enjoy them, and send the foreign government a note of thanks. According to these analyses, the subsidies and promotional efforts—the targeting—will not, over the long term, affect national comparative advantage; the government will not succeed in reaching its goal.

In assessing foreign government sector-specific policies and deciding on U.S. response, there are two issues to consider. First, can promotional policies aimed at specific sectors permanently alter the competitive balance in those industries? The answer is a clear yes. In microelectronics and civilian aircraft, American firms had a dominant world position, built in no small measure on the base of military programs and procurement in the 1950s. Japanese electronics and European aircraft programs have created real and enduring rivals. Particularly in the electronics industry, Japanese policies helped firms overcome real barriers to entry into world markets. It assisted them in catching up technologically and in launching production in a closed market. The same story can be told about optical fiber technologies. The structure of the worldwide industry was, as a consequence, permanently altered. Policies can act in a variety of ways to alter market structures. If market position rests on a service network, then subsidized sales that allow the service network to be built up will permit a market position to endure after subsidies are ended. If market position depends on technological development and a country protects its market while investing in a particular product development, then its targeting efforts can help create enduring competitive positions. New trade theories have at last begun to provide a theoretical foundation for what was already known by most policy makers in the countries that have been making the best economic progress, but denied by those who looked at competition through a traditional economic lens. In imperfect competition—and most important international industries involve imperfect competition—strategic trade policy can work. When governments provide subsidies or protection, or both, they increase the resources available to firms competing in oligopolies. Those increased resources can alter firm strategies, allowing them to pursue different market, pricing, production, and product tactics. Of course, whether a particular firm can use those resources to build an improved and defensible market position is always an open question. We have argued elsewhere that policies that seek to affect the structure of an industry by promoting specific market outcomes without regard to the logic of competition or the dynamics of the companies in that industry will



ultimately undermine the firms such policies purport to help.[12] There is nothing automatic about market success, no matter who is playing the game. But there should be no question that governments, through their policies, both intended and not, do shape market outcomes in international competition, and they do it very often.

Second, if a government helps firms in an industry create advantage in a specific sector, can the outcome in that specific sector affect, in any important way, the national comparative advantage? For the country promoting its industry the question is whether, even if it succeeds in helping firms to establish competitive position in world markets, it has not really wasted its money by diverting resources from those sectors where firms without subsidy could establish themselves in world markets. For the United States the question is whether it should accept the subsidy as a gift or fear it as a Trojan horse.

The answer to both questions depends on how one thinks the economy works and what the nature of the interconnections between sectors are. If resources move smoothly between uses without generating unemployment or economic dislocations, then perhaps the United States might want to accept the subsidy gift. If there are other opportunities for the workers and the communities in which they live and if the time of adjustment is brief, then the United States still doesn't have a national problem. (Of course, we might ask why we should allow those in the targeted industry to bear economic dislocations imposed on them by foreign government choice not market logic, but that is a separate issue.) The static, one-time costs of adjustment that might be paid to adjust the economy to imports based on foreign subsidy are an important policy problem, but they are not the central issue in this discussion.

Our central concern here is with the longer-term development of the economy and with the structure of the nation's comparative advantage. Let us put the question differently, then. Can foreign targeting of one or several sectors affect the structure of American comparative advantage? Conversely, could support of particular sectors assist America's way through the industrial transition and keep us at the top? Sustained investments, both public and private, are the link between competitive advantage in particular sectors and changing national patterns of comparative advantage.

If sectors are all equal so that we can be indifferent as to what we produce or if they are so thoroughly disconnected that what happens in one sector is of no consequence to the others, then the United States can be indifferent to the displacement forced by industrial development policies abroad. We may then wish to value those foreign subsidies as a gift.

However, the larger the consequences of development in one sector on the evolution of others, the more we should hesitate and inspect the gift to make sure that accepting it doesn't entail taking real risks. In Parts I and II of this book we examined these linkages between sectors from different vantages. When the Japanese supported the development of the steel industry in the 1950s, MITI argued that investment in this capital-intensive industry in a period of capital shortage made sense because of the possibilities it would open to the rest of the economy. Universally in Japan, and for some analysts in the United States, the semiconductor industry has the same critical or economically strategic character. The real economywide consequences of the rise or decline of a single industry depend on the linkages between sectors, the spillovers of technology, and the character of international markets. The linkages of particular importance are those between different high-technology sectors—links that sustain technological dynamism—and those between high-technology centers and traditional sectors where products and production processes are being transformed. We have already emphasized that sectors and activities in an economy are linked together. Some of those linkages are very strong—that is, if one activity disappears, the other will as well: production equipment repairmen without factories full of equipment are sorry souls. Other linkages are very weak: an appliance repair firm is indifferent to the national origin of the washers it services. But glass manufacturers who sell to General Motors or disk drive producers who sell to computer companies are likely to lose their clients if foreign cars or foreign computers capture the American market. British glass manufacturers are not likely to find markets in France or Germany to compensate for the loss of British-produced cars, and American auto or computer parts manufacturers are unlikely to find markets in Japan.

However, it is the interconnections not just in the sale of products that tie sectors together, but also in the flow of technologies.[13] Why can't the United States simply buy semiconductors and embed cheap semiconductors into expensive computers? The value added would come from architecture, software design, and applications. The Danes did something like this in the nineteenth century when they imported cheap American grain and fed it to pigs and cows rather than trying to defend the domestic production of grain. The character of sectoral interconnections—the nature of a sector's linkages to other pieces of the economy—and the process of technological "spillover" are crucial. The spillovers flow forward from products such as semiconductors. Certainly semiconductor products can be purchased in the market by all producers. However, those from computer makers through television producers who themselves use microchips to



innovate require knowledge of products in development months and even years before they are available in the market. The merchant semiconductor producers—those who make the product to sell to others rather than for their own use—require an intimate relationship with clients to design and develop next-generation products. Will U.S. producers of computers be able to stay ahead of Hitachi if they depend on Hitachi for semiconductors? Will U.S. semiconductor makers be able to stay ahead of—or keep up with—Fujitsu if they have to depend upon Fujitsu for new production equipment? Can GM ever surpass Toyota in productivity if it relies on Japanese production equipment and control systems for its productivity gains? If the technology in question is quite mature—that is, if it changes little—the urgency of the question is much reduced. If the technology is changing rapidly, the question becomes vital. The interplay between users and technology producers is the critical element. Final product companies that have distinctive needs induce innovation from component and equipment companies. We have examined the consumer electronics industry, where Japanese firms which dominate the sector have been large users of a low-speed but low-heat technology known as CMOS. Their experience with this technology gave them an advantage in turning this consumer electronics technology into a base for dense high-speed computer chips.

The spillovers—the know-how and the technological sparks—pass through two sets of channels: *markets* and *communities.* A microchip may be purchased in the *market* and the engineering then reversed to discover how the chip works, but that takes time. Dependence on foreign sources for a technological innovation could affect the entire range of user industries, but only if the transfer time for that technology through the market were too slow to permit users of one nation to implement that technology fast enough to remain competitive in their own product designs. The debate has become intense because many Japanese firms are highly integrated, producing production equipment, components, and final systems. Indeed, we know of instances where materials in the production process for semiconductors have—with reason—been withheld from the market by integrated Japanese firms. Thus the question of whether markets will pass along technologies from one nation to another is not an abstract one; rather, it turns on the organization and dynamics of specific markets in specific countries.

Equally, knowledge passes through *communities,* the learning and diffusion of technology occurring through conversations and from job switches. Certainly, scientific communities are highly international, and business dealings and transnational alliances diffuse new technology internationally. Indeed, while actively suing Japanese semiconductor producers for

dumping, American producers are busily insisting that technology-sharing arrangements would be honored. Yet business and technological communities remain more densely national than international. This is especially true in some countries. If new experimentation, both technological and in business strategies, takes place in the telecommunications and semiconductor industries, it is essential that those ideas spread throughout the American economy. Of course, this is not an abstract problem. The reality is that our major competitor is Japan. The Japanese community is organized around business groups from which there is very little outward movement of personnel. Microchip innovation within a group will be used to advance final products produced within that group, and the producers of final products within that group serve, at least in part, as a captive market. The Japanese community itself is quite closed, certainly when compared with the United States and Western Europe, and spillovers of technological innovation within Japan will almost certainly move more rapidly inside Japan than out from it. Those innovations will most likely move as final products through market channels. The economy, as we have argued, is not a set of disconnected pieces, but an interwoven fabric.

The fate of specific sectors, carrying both the technological code of the future and the market demand to implement it, can affect the pace and character of economic transitions. At particular times particular sectors have been the keystones of whole structures of technological and economic advance. The claim that some sectors are critical can quickly degenerate into a claim that all are, and that strategic policies become programs of generalized subsidy and protection. Nonetheless, at particular historical moments, some sectors are quite clearly crucial. In the middle part of this century, automobiles became both a symbol of mass production and a source of innovation in production technologies. That production knowledge unquestionably spilled over into related sectors that could use similar strategies and technologies. Similarly, in Japan, autos and consumer electronics served to generate machine tool and production technology industries and helped to create a manufacturing advantage in the Japanese economy as a whole. Knowledge spreads and diffuses.

The policy problem is to know which sectors are critical, so let us not run ahead of ourselves to a series of sector-specific policies. Just because we might accept that some sectors are economically strategic, even if we admit that their emergence could alter the comparative advantage of a nation by driving a broad wave of development, how do we know which sectors they are? In the years after World War II those countries that adopted systematic sectoral policies were relatively backward. They were less developed than their rivals and, consequently, could look at the industrial structure of their more advanced competitors. They had maps of the future. Still, the question was how to read the maps. There were a number of evident criteria, including those used by MITI:



1. Was it a growth sector?
2. Were there substantial potential export markets?
3. Were there long-term declining costs either from scale or learning curve economies so that, if volume of production grew, costs would fall?
4. Were there substantial income and price elasticities so that, as Japanese incomes rose and prices fell, demand would steadily grow?

In the present period additional criteria might have to be added.

5. Does a sector have the potential to influence the product characteristics and production processes of other industries?
6. Is it a transformative sector? Will a mastery and lead in this particular technology open big new possibilities in other sectors of the economy?
7. Will there be substantial negative consequences elsewhere in the economy of not being state-of-the-art and competitive in this particular technology and being, therefore, dependent upon foreign providers and the next round of foreign developments and applications?

Much depends on the channels through which the technology and know-how flow and the link between component development and final product design. Many in Japan believe that there are strategic sectors that historically allow one country to be dominant during a particular period of history. The notion is that semiconductors are at the beginning of a decisive industrial chain.

Strategic transformative sectors are those emerging industries whose products alter goods and production processes throughout the economy, as we argued in Chapter 6. They transform the rest of the economy. The technologies spill over into other sectors and often do so through channels that are tied to national communities. The emerging character of the industries which are the source of these technologies gives competition in them a strategic character in which decisions by one firm can alter the very character of the market and the choices open to other firms. In such emerging or

shifting sectors—industries with strategic competition—government policies can shape the very character of international markets. Moreover, establishing position in these industries can indeed give a firm or a nation a dominant position in a stream of product and process innovation.

Perhaps, then, America can act in specific sectors in ways that can affect the nation's industrial development and comparative advantage, and, perhaps, it can identify those sectors which are strategically located in the economy. That does not mean that the solution to those sectoral problems ought to be sectoral policy. There are many risks in sector-specific policies. First, it is not always evident what should be done. Let us say we should support the development of the semiconductor industry. There would be limited agreement as to which firms and which strategies should be supported. The uncertainty is inherent because the industry is in the process of unfolding. The lines of development, as we argued earlier in this part, are yet to be established. Second, if we open wide the Pandora's box of sectoral-specific policy, we may not support the development of key sectors or competitive firms, but rather may lavish resources on those sectors which have the greatest political clout, usually those with the biggest battalions and the longest political experience.

We should be relieved therefore that the conclusion that particular industries matter disproportionately to the national economy ought not to suggest that we should automatically run after these sectors with buckets of money trying to pick the specific firms to back or that we should suddenly waive all taxes on all firms that produce electronics gear. Identifying the problems and potentials of particular sectors does not mean that the policy solution should be specific to the industry. Sector-specific policies are certainly not the only answers to the problems of sectors, nor are they necessarily the best. They are the most difficult to sell politically and the hardest to implement well. Once understood in terms of the strategic questions we have just reviewed, they can be answered, more often than not, through the factor level and market perfecting policies we discussed previously.

In many ways America is in a particularly fortunate position insofar as making policy to improve competitiveness is concerned. We have done so little that there is a huge layer of easy things we can do before we get to the hard ones. And those easy ones have by far the biggest impact. Most countries have already geared their basic economic policies toward international competition. We haven't. That gives us a kind of "advantage of backwardness" position in policy making. It is a little like energy conservation a few years back. The United States had done so little in that direction compared to Europe or Japan that, while other countries were at a stage



where they had to take very difficult measures, we could do easier things —things they had done years before—and get huge returns. The same is true in competitiveness policy. Only let's hope that in competitiveness policy we take better advantage of our privileged position. Because we have done so little in the past to shape policy to the goal of competitiveness, we are, among all our competitors, uniquely privileged.

allies to cement strategic deals. Consistently subordinating economic goals to alliance objectives was only possible when we had a dominant position. A competitive commercial weakness will now begin to become a strategic weakness by weakening the pace of technological and production evolution. Production of defense goods will cost more for less adequate equipment, which will be based on technologies that may no longer be at the cutting edge.

### COOPERATION IN MANAGING CHANGING INTERNATIONAL ROLES

Changes in the relative power of nations, be it economic or military, are always hideously difficult to manage. Roles that have been established have to change. We are in such a period now with the diminished position of the United States and the growing economic power of Japan. Europe matters vitally, but its position and role are not shifting sharply. The European issue is what stance Europe will take toward the converging roles of the United States and Japan.

The United States is compelled to attend increasingly to its short-term domestic needs in making international economic policy. Because of the sheer scale of the American economy, domestic decisions have massive international consequences. Managing those consequences, both economic and political, will require cooperation. Put baldly, for the United States to act narrowly in its short-term interests, some might say selfishly, without disrupting international economic relations demands conscious toleration from its trade partners who are also its trade rivals. This is not to say that the United States was magnanimous in earlier years, but rather that the interests it pursued corresponded with the international system as we had constructed it. Now we can shake the system but not shape it to our design.

Conversely, Japan's increased international economic strength, represented by its trade surplus and overall creditor position, which is not yet fully acknowledged or understood in Japanese politics, requires that it increasingly act from its long-term interest in the stability of the international economic order and, if need be, purchase through concessions the continued participation of its partners in an open system.

In essence, an American strategic trade policy will require a shift in the dynamic of competition and cooperation in the international economy. America's allies have a real stake in such a strategy. Unless America can define its priorities and pursue a set of limited objectives, a less controlled and more generalized departure from open trade and international cooperation is a real likelihood. The question is not whether the American position and role will change, but what the terms of that change will be and whether it can be managed without extensive turmoil.

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# Conclusion: The Myth of the Post-Industrial Economy

SOMETIMES new notions capture our fancy, resonate to some element of our experience, and color the way we see the world. The concept of a post-industrial society is just such a notion. It resonates to our experience of big changes, shapes our perceptions of their tone and texture, and organizes our understanding of their direction. But the notion obscures the precise location of those changes and their meaning.

Things have changed of course. Production work has changed. People go home cleaner; more of them leave offices than assembly lines. Service activities have proliferated. The structure of enterprises is different; the giant bureaucracies of finance and corporate conglomeration dominate the skylines of our cities, even while economic rejuvenation depends on a myriad of more entrepreneurial firms. The sociology of work and the organization of society have changed along with the technologies of product and production.

But the relationship of those changes in technology and society to changes in the fundamentals of economics and politics is less clear. Despite predictions, political power has not passed to a new class of technical experts who dominate access to scientific knowledge. There has not been

even the faintest trace of it happening at the national level, nor has it happened at the corporate level. While formal knowledge matters enormously—more than ever—the expert and his knowledge are, for the most part, embedded in the corporate bureaucracy. IBM, despite its efforts, may not be able to control the lives of its scientist employees the way employers in some factory towns did a century ago, but the economic value of the knowledge they embody is captured quite as successfully by the corporation, and a salary is paid to the employee. Indeed, the fruits of their knowledge are captured in silicon and sold by the corporation as a commodity quite as successfully as more humble mechanical knowledge was sold a hundred years ago. However strange and wondrous their products, the entrepreneurs of Silicon Valley have much in common with the entrepreneurs of Manchester in 1840. And for the vast majority of service workers, continuity is as strong and depressing a reality as change. The majority of employees in McDonald's are little different—in any positive ways—from employees in the thousands of small luncheonettes of an earlier era. For the vast majority of hospital workers and schoolteachers the promise of new scientific knowledge contrasts in ways that are difficult to resolve with the realities of their daily work experience.

The growth of service employment, even of white-collar employment, has not put an end to labor struggles and class conflicts of earlier industrial periods. Whatever its merits as a principle for organizing our understanding of sociological change, we have yet to arrive at post-industrial politics. Nor is there post-industrial economics. The division of labor has become infinitely more elaborate, the production process far more indirect, involving more and more specialized inputs of services as well as goods and materials located physically as well as organizationally far from the traditional scene of production, the proverbial shop floor. But the key generator of wealth for the expanded and differentiated division of labor remains mastery and control of production. Niche economies can specialize in one part of this division of tasks. New York City, or Washington, D.C., or Monaco, or the Bahamas, or Switzerland can specialize in services or a particular subset of services and prosper. But an economy as vast as that of the United States cannot be fit into any niche. Our labor force may well be located in services. Yet as we have seen, the jobs of many, and the income levels of almost all, depend upon American mastery and control of production.

The transition we are experiencing is not out of industry into service, but from one kind of industrial society to another. The choices we make as a nation, the policies and priorities we choose, will determine whether the transition marks the end of a half century of American power and industrial leadership.



The argument of this book is straightforward. It can be summed up as follows:

1. There is no such a thing as a post-industrial economy. Manufacturing matters. The wealth and power of the United States depends upon maintaining mastery and control of production.

2. Changes in the extent and forms of international competition coupled with the mass application of microelectronics-based technologies are revolutionizing production. The United States is not doing very well in this new international competition. The most important competitive weaknesses of U.S. firms are in the production process. These weaknesses endanger the strengths of those firms.

3. A flight offshore for cheap labor will not provide a winning long-term strategy; after a few rounds of product and process innovation it will just compound the problem. A strategy of trying to hold onto the high-value-added activities while subcontracting production to foreign producers who have a manufacturing edge defines the fast track to disaster. Over time American firms will not be able to control what they cannot produce. The only viable strategy for American firms is to combine advanced technology with high-skilled labor and innovative management to create high-wage, high-productivity, flexible production capabilities.

(4) Policy sets the terms of the new competition. Policy can help to upgrade a nation's position in international competition in a substantial and enduring way. Or it can handicap national producers and accelerate a downward spiral of weakening production capability, offshoring, further weakening, more offshoring, and a flight into pure distribution and defense contracting. The one thing policy is least able to do is to have no impact on a nation's competitive position. And that, of course, is what is conventionally prescribed for American policy making. That policy cannot simply go away or be "held harmless" in its economic impacts is true not only for America, but for any complex, modern society. That truth is compounded by the fact that the international economy consists today of several large and complex national economies that are all heavily policy-impacted. One nation's policies affect another nation's competitive position. Were it achievable, policy neutrality in all nations might well be the best rule for The System as a Whole (though not necessarily for any particular nation in that system). In the absence of such universality, it loses any claim for being the best rule for any particular nation. America has, to date, formulated economic policy with no attention to competitiveness. If we are going to be able to choose our own future and not just submit to it, the focus of our policy-making attention will have to change. Competitiveness will have to become a primary concern. Concretely, the United States will have to develop policies to promote investment in technological development

and diffusion, in a skilled work force, and in the offices and factories that embed and house the technology and workers.

(5) We suggest that there is a better way to talk about development —about what matters and what does not matter to sustaining the prosperity and international leadership of the U.S. economy in world competition —than that provided by the paradigms, perspectives, and arguments of conventional economics. It is not that the standard arguments are technically flawed; they have been not so much disproven by keen debate as betrayed by changing reality. We suggest an alternative approach which, though less conventional, is, in the final analysis, far more prudent. It leads not to simple answers and pat policies, but to real choices. Rather than just letting a future happen to us—a future that is coming on fast and that we may not at all like—we can—not completely, but to an extent that matters —shape our future.

Our conclusion is upbeat in substance, strategic in perspective, though guarded in prognosis. The outcome of America's passage through the industrial transition need not be exclusively the affair of impersonal and imperturbable technological and economic forces. There is room for choice and action. That is the good news. It is good because at present we are not doing terribly well. The competitiveness of U.S. producers has been showing signs of serious weakness for quite a few years, even discounting the crippling effects of the overvalued dollar.

The bad news is contained in that same sentence: there is room—and need—for choice. Just because we have a choice about our future does not mean that we will take advantage of that opportunity, use it well, and even enjoy the freedom and responsibility choice provides. We have a political system which we cherish that is artfully constructed to avoid clear choices. And we cling to an economic ideology based on a notion of choice that minimizes the opportunity and desirability of making important, strategic ones.

There is a spectrum of possible economic futures open to America. At one end lies an internationally competitive U.S. economy in which highly productive, educated workers use new technologies flexibly to produce a broad range of high-value-added goods and services. They thereby earn the high wages necessary to sustain both the standard of living to which many Americans have grown accustomed and most aspire, and the open society that has been so closely linked with a strong and open economy. At the other end of the spectrum lies the real danger of a competitively weakened economy in which a small minority of high-skilled jobs coexists with a majority of low-skilled, low-wage jobs and massive unemployment. Living standards—perhaps along with social equality and political democracy—would deteriorate rapidly as, in order to compete, manufacturing and services move more and more value added offshore and automation strips the labor content from the remaining U.S. goods and services.



The transition sets the agenda of change, but there is nothing inevitable about the outcome.

The position we argue is simple. If we are wrong, the policies we propose will amount to accelerating the pace of industrial change by investing in people, plant, and technology at the expense of consumption. The medicine may prove unnecessary, but in the end America may be wealthier, more confident, and less troubled. If we are right, then there is reason for urgent concern and a need for immediate action. We propose the course of least national risk and, indeed, the course of least national regret.