

Geo-Economics: Lessons from America's Mistakes

Stephen S. Cohen

Working Paper 40

Revised Version: Spetember 1992.

Research and work on this paper benefited from the generous support of the Alfred P. Sloan Foundation.

Fundamental changes in the world economy are rapidly reordering the hierarchy of wealth and power among nations. That the United States' economy is navigating that transition badly should by now be evident; though the implications of those difficulties for Europe as well as for the U.S. are uncertain and discomfoting. However, at the moment, the very real problems of the European economies are concealed by the dynamism and enthusiasm generated by the acceleration of European integration, and by the opening of a new European frontier to the East.

In this paper, I would like to depart from the tone of Europhoria and concentrate on a particular set of difficult economic and societal questions that will not prove amenable to traditional solutions, whether taken in an atmosphere of slump or one of expansive boom. For Europe has a choice. It can respond to the challenges of this transition, enhance its wealth and power and in the process find itself structuring a better society; or it can, as the United States has, set out in the wrong direction in its response, erode its power and wealth, and create a less prosperous, a less generous, a less just and a less secure society. That fatal choice of a negative direction begins with denial, with a failure (or refusal) to recognize the new nature of the economic problem. Denial is an easily attained attitude as it is supported by the weight of established interests and practices, by the momentum of prosperity, the press of greater, more dramatic issues and by the authority of conventional economics. The choice confronting Europe, however, is real and very big though it is not played out at the level of high politics on which the other epocal choices now engaging Europe are played. Europe can learn much from the American experiences of this past decade. Though they are not pretty experiences, the lessons they embody are of vital importance to Europe.

I. The Nature of the Transition

Two quite distinct sets of fundamental forces are driving the transition in the international economy. The first set consists of basic changes in both the extent and the nature of international competition. The second is a set of cumulating innovations in the organization of production that is displacing mass production as the dominant mode of production with something new that we can call high volume flexible production. American producers have experienced the impacts of these changes more extensively and more suddenly than their European counterparts and they have hit a vast array of sectors ranging from semiconductors and

lasers, to computers and controllers, to automobiles, outboard motors and lawn mowers, through bank loans and corporate financing.

I. 1. The New Extent of International Competition:

As recently as the late 1960s, foreign competition was a marginal phenomenon in the U.S. economy. Despite the successes of successive GATT rounds, and a commitment to an ever more open economy, trade numbers remained small; exports (or imports) rarely exceeded 4% of GNP. More significantly, their composition was not threatening to many major sectors. Indeed, the biggest trade flow by far was with Canada, and trade was conducted in such a way as to deny the basic notion and force of foreign competition: the biggest trade volume was in automobiles, and it was confined to interplant transfers within the big three American companies. From the top floor of GM headquarters in Detroit, one could even see the Canadian operations across the river. Now, some 70% of everything we make is subject to direct, or imminent, competition from foreign based companies. Competition now strikes at the fundamental competence and even the existence of major American industries and companies. This change is so huge and so sudden as to qualify as "Revolutionary."

Europe's experience here is quite different. For Europeans, international competition is not new, and the movement toward a Single Market has vastly intensified that competition. But it is still overwhelmingly intra-European in nature. Conventional statistics show Europe accounting for some 43% of world imports; however, if one combines the 12 EC nations with the EFTA group to eliminate intra-European trade from the data, Europe's share of world imports suddenly shrinks to 12%.¹ On a per capita basis, Europe imports only one fourth as much manufactured goods from Asia as does America.² With the important exception of a large set of U.S. based multinational companies, for the most part long established in Europe, competition from foreign based suppliers (transplants) is only just beginning to be a serious fact of European life.

The small volume of extra-European industrial imports, and the still small force that extra-European competition exerts on the European economy, leaves Europe's exposure to

¹ CEPII, *Commerce International: Lal Fin Des Avantages Acquis*, Gerard Lafay and Colette Herzog with Loukas Stemitsiotis and Deniz Unal, Ed. Economica, 1989 (pp. 55-57)

² *Ibid*, p. 53

international competition, in the critical sense of a major force reshaping European life, still intermediary between that of the U.S. in the early 1970's and America's current situation. Despite all likely efforts to maintain that situation, it will not stay that way very long.

I. 1a. The World is not yet "Global"

This radical increase in the extent of international competition should not be confused with the currently fashionable notion of "globalization." Competition is multinational, but it is very asymmetric and is not yet open or unaffected by policy. The world is not yet round. Despite the failure (or refusal) of the American government to recognize this fact, direct government policy plays a critical role in determining outcomes in international competition, perhaps now more than ever. It is the legitimate concern of government to seek to increase high value activities and economically strategic activities performed on its own soil by its own nationals.

We do not yet live in the age of the "global corporation" nor, in its logical concomitant, a world of politically undifferentiated economic spaces. Perhaps one day, perhaps soon, we will. But for the moment there are very few "global corporations" and there are relatively few economic spaces unconstrained by political considerations. For the present, we should continue to assume a real relationship between ownership and control. We should assume that all Multinational Corporations are not the same; MNC's from all Home countries are not the same; and all Host countries do not *de facto* set the same conditions for behavior on all MNCs.

Companies are not global: American MNC's are the most mature and the closest to global. Yet recent U.S. Commerce Department studies indicate that about 3/4's of the total assets of American MNCs are still accounted for by the parent operations in the U.S., with similarly high proportions for sales and employment.³ Despite much outbound investment these past years, that proportion has not changed much. For Japanese based MNCs, I would estimate the proportion of assets at the parent operation to be well over 90%. Even by these crude numbers, there is a long way to go before companies become global.

The weight and role of foreign based MNC's varies dramatically from Host country to Host country. In Germany and most of Europe, foreign based MNC's occupy a big place in the

³ Raymond Mataloni, Jr., "U.S. Multinational Companies: Operations in 1988," *Survey of Current Business*, Vol. 70, No. 6, June 1990, pages 31-44

economy and are able to behave a lot like nationals; in Japan they do neither. Substantial reciprocity is needed here before we can entertain the notion of global companies. In this particular debate Japan is not a trivial exception to an otherwise solid general rule. It is one third of the game, and far more than that in terms of pressures, changes and future developments.

Ownership is not the critical consideration; behavior is. But behind behavior and shaping it lie influence and control. Corporate behavior -- what companies do and don't do within a country and with that country's people -- directly determines the wealth and power of that country. Ownership, we have learned in this era of takeovers, has a non-trivial relation to influencing corporate behavior. Also, when circumstances get exceptional, even the most global of Multinationals take orders from their home governments. The constrained response of American based MNCs to the proposed Soviet-European gas pipeline a few years ago is an instructive example. So are the numerous problems European companies have had with U.S. based suppliers of advanced technologies on questions of U.S. government notions of "Dual Use Technologies." The very recent story of Mineba, the Japanese ball bearing company, purchasing and then systematically closing down U.S. capability in miniature ball bearings for what was presumably its own strategic reasons -- despite assurances to the contrary (to the U.S. government in general and the Pentagon in particular) -- is another example that should give pause.³ Ownership and nationality often do matter. Similarly, asymmetries in Host country rules can have magnified effects through the instrument of the foreign based MNC. For example, the U.S. has neither formal nor *de facto* "domestic content" controls. The U.S. also has a unique comparative advantage in plant closings and lay-offs; it is hugely easier to close a plant or fire a large number of workers in the U.S. than in France, or Germany or Japan. A Japanese based multinational, for example, may find advantageous business reasons quite in harmony with the wishes of its Home government (whether formally expressed or not) when business conditions turn sour, and "rationalization" is needed. It is quite likely that under these conditions the U.S. will find itself absorbing a disproportionately high share of layoffs and plant closings, far more than simple "economic" reasons would have dictated, and far more than would have occurred had the U.S. plants not been controlled by a multinational, or even by a Multinational based in that particular Home country.

³ Report of the Defense Science Board *Task Force on Foreign Ownership and Control of U.S. Industry*, Prepared for the Under Secretary of Defense for Acquisition, June 1990, Washington, D.C. (pp. 17-18)

Similarly, some countries clearly permit a "market in companies" while others, it seems do not. The U.S. and UK figure most prominently in this list. In others, most prominently Japan, it is an extremely rare event for a foreign company to purchase a substantial Japanese company. (Sweden and Switzerland seem in this regard to be a lot closer to Japan than to the U.S. and U.K.) Reciprocity in many such areas should be a pre-condition to a *laissez-faire* policy for direct foreign investment, to policy based on an assumption of "globalization".

A more complicated and more important set of notions concerning technology, spillover, linkages and predation is, or should be, involved in making policy concerning direct foreign investment. In sketch form we can say that in the modern world a nation's wealth and power is due much less to its natural endowment of minerals and soils, or even its ability to amass capital and labor, than to its ability to diffuse new technology, both product and process, throughout its industrial system and to diffuse new skills and methods throughout its population more quickly and more extensively than competing nations, and to hold that relative advantage as long as possible. Then to do it again. And again.

Direct foreign investment can help or hinder that process. There is no *a priori* way to know which way particular projects will cut. Everything depends upon the particular circumstances of the particular investment.

Some industries and technologies are especially important carriers of innovation. New materials, biotechnology, optoelectronics, micro-manufacturing and semiconductors are some well known and important examples. In these cases, careful attention should be paid to major foreign investments, especially those that might either reduce potential competition in that technology or in its upstream or downstream uses, or that might short circuit the domestic diffusion process. Here, there is no substitute for well informed judgement. A universal rule will not do. In industries and technologies where numerous companies in many countries compete, no policy judgements are required. But where a small number of giant integrated groups from one country threaten to control the technology, careful evaluation is valuable. For example, a strong foreign company that is nationally, not just legally, independent from a national grouping that threatens to dominate the industry might be the best solution, even if its terms seem, at first, more difficult.

If all technologies diffused through scientific literature and through commercial markets, and those markets worked well, then national boundaries would have no impact on where

technology diffused and at what pace. But they do not diffuse that way. Technology diffuses through communities, through hierarchies, through organizations as well as through markets and formal professional literatures. In different countries this all-important diffusion process takes different forms and operates through different channels. In Silicon valley, technology diffuses as people change jobs; one can hire the technology. A good deal of what is interesting in commercial technology in the U.S. is developed in small and medium sized companies; one can buy them. In American Universities the latest in technology is provided to all comers. None of these channels is particularly important in Japan where technology tends to stay in large corporate groups until it comes out as product. Most European nations are closer to the U.S. than the Japanese model.

These fundamental differences in the institutional structures of nations do not represent differences of goodness and badness, and no nation seems willing to change such fundamental structures. But the asymmetry has enormous consequences. It is into this critical asymmetry that foreign investment enters and must be judged.

A simple universal rule will not suffice, nor is it needed. The problems surrounding direct foreign investment are not universal in scope or invariable in form. They are quite narrow in scope and depend upon very particular circumstances for their meaning. In substantive terms we are usually concerned not with all investments coming from all nations into all industries, but with direct investment by companies of U.S., Japanese and European nationalities. Furthermore, our concerns will focus far more on the Japanese than on the Americans or Europeans, and even more narrowly to a small set of Japanese Keiretsu companies rather than companies of Japanese nationality in general. Finally, those concerns narrow to a reasonably small set of sectors and technologies: we are more concerned with silicon chips than potato chips, with real time control than with real estate, with flat panel rather than fashion displays. Europe and the U.S. should equip themselves with a capability to analyze the meaning of critical, direct foreign investment for their national objectives. (Japan already has more than enough of such an apparatus.) They should have the capability to act flexibly to encourage (or discourage or harmonize) such investments with their national objectives. America does not have such a capability; more important, it adamantly refuses to develop one, or to pay any attention whatever to existing governmental capabilities. Europe should not follow America's example.

In sum, though competition has become multi-national, the economic landscape is not yet "global." The world is not yet round and clean and free of political constraints and untouched by the effects of national industrial strategies. As we shall see below, governments still matter to the outcomes of international competition, perhaps more than ever!

I. 2. The New Nature of International Competition.

International competition has changed as much in its nature as in its extent. The important change is not, as it is commonly put, a geographic shift from the Atlantic to the Pacific. Rather, it concerns the rise of the Developmental State and its impacts upon the world trade and development system.⁴ The Development State defines a new set of arrangements between the State, society and industry, designed to change the structure of the nation's comparative advantage. It was, of course, first and most effectively developed in Japan; but it is now being imitated, with varying degrees of success, in several countries. Japan pioneered a set of institutional innovations. These include: a) the State operating as a Gatekeeper to determine what can enter the Japanese economy (and under what conditions), including technology, and direct investment as well as product b) a Keiretsu system that creates loose "virtual integration" at a massive new scale and c) a capability to target key technologies, and promote domestic industry, by channeling cheap capital and by promoting lively (but controlled) competition among Japanese companies and encouraging early forays into outside markets to hone competitiveness.

The result is not simply that Japan runs a surplus in its balance of payments, or that the United States has been running deficits. That is a macroeconomic matter. The important result of this fundamental change in the system is strategic. It is to be found in the composition of trade and the resulting rate and structure of industrial development. Its significance lies in the cumulative creation, over time, of a new and superior structure of comparative (and competitive) advantage in Japan and a corresponding weakening of those capabilities in its trading partners. It also has a system effect on the world trade and development system.

The post-war international trade regime was based upon two fundamental ideas: trade would be intra-sectoral, and direct foreign investment through multinational corporations would

⁴ The Developmental State is Chalmers Johnson's phrase. See his important book, *MITI and the Japanese Miracle*, 1982.

be a major vehicle of market penetration. Both would operate on a large scale without devastating the industrial and social landscapes of trading partners. As tables 1--4 indicate, Japan is an exception to the fundamental pattern of trade on which the post war international economic order was predicated, that is, intra-sectoral specialization. These tables show manufactured exports and imports for France, Germany, the United States and Japan, ranked as a share of total exports.

For both France and Germany, for example, automobiles are the leading export accounting for over 6% of total manufactured exports for France and about 9% for Germany. The important point, however, is that automobiles are also one of the highest import sectors in both France and Germany. The tables demonstrate a pattern of substantial imports in those same sectors in which the nation is a strong exporter. For France, five of the top ten import categories are among the top ten export categories. The Japanese pattern is fundamentally and distinctively different. Crudely put, Japan does not import in those sectors in which it is a major exporter. In none of the top ten export categories are imports as much as one per cent of exports. There are many possible explanations for this distinctive and system destabilizing pattern. They are not our immediate concern here. The effects, however, are: sub- sector specialization, or intra-sectoral trade, is at the heart of modern trade theory. It is, in fact, what has permitted international trade to grow, often faster than GNP in the post war period, in ways that have been largely beneficial to all parties without creating a predatory pattern of large, sectoral devastations among trading partners. Absent that pattern of intra-sectoral trade, international trade becomes a process of one nation wiping out large sectors (e.g., autos) in another. It becomes fundamentally predatory and unstable.

The MNC, not simple imports and exports, was the post war device for Transatlantic economic penetration and technology transfer without economic devastation. Acting as gatekeeper, the Japanese State was able to break up the package of product, technology, capital and control that is the Multinational corporation, and to reassemble those pieces in Japan, under Japanese control. With a handful of conspicuous exceptions, neither American nor European MNCs were able to leverage their early lead in technology, quality and volume into sustainable major market positions in Japan. Advantages in product innovation could quickly be nullified in the Japanese market, where scale and scope economies would accumulate, and the outcome would be decided as a manufacturing game. This story was repeated in sector after sector, in

automobiles, in consumer electronics, in semiconductors. Japan is changing. The capital market is much more open now than it was just a few years ago, and with real consequences. But despite rapid change, the fundamental pattern is still very much in place, especially in new targeted industries.

I. 3. Revolution in the Organization of Production:

The second set of epochal changes that drives the transition in the international economy is of a different nature. This is a fundamental change in complex manufacturing, a change of revolutionary import in the process of production. Though largely a Japanese innovation, this revolutionary change in complex manufacturing is in no way bound by national policy, ethnicity or culture. Like the mass production revolution which preceded it on the trajectory of cutting edge industrial development and which had its origins in the United States, this new approach, which we can call high- volume flexible production, or velocity production, or "lean" production, can be learned by Europeans. The problem is that despite many important exceptions, they have not yet learned it. And they must. For volume flexible production commands a decisive competitive advantage over traditional mass production and it strikes at the heart of the wealth generating activities of the advanced nations: complex manufacturing, producing automobiles, trucks, washing machines, televisions -- a truly vast array of products. Why is it of fundamental importance and not just an easily overcome problem? Because it is not a quickly learned gimmick, nor is it embodied in machinery that can be purchased, nor can its cumulating advantages over traditional mass production be overcome by intensified investment in mass production combined with cheaper labor. It must be learned and developed through massive and painful organizational change. And it commands in its realm a truly decisive advantage over traditional mass production, even when well done, as by the best European auto producers. In automobiles, lean production uses less of everything compared with mass production: half the number of human work hours in the factory, half the manufacturing space, half the investment in tools and machinery, half the engineering hours to develop a new product, and half the time to develop that product. It also requires less than half the needed inventory on site, turns out products with far fewer defects, and produces a greater and growing variety of

products."⁶ It is, in brief, almost as decisive an advantage over mass production in its core realm as mass production was over craft production. It may have similarly potent consequences for the competitive positions of nations, and for the organization of society.

Table five summarizes a complex story. It is worth studying carefully. It compares the performance of Japanese, American and European auto plants.

The differences between Japan and the U.S. are striking: one third fewer labor hours per car, one tenth the inventory carried and 30% fewer defects. These differences are at the heart of the compounding crisis of the giant American automobile sector, a crisis that is growing worse and worse despite protectionist quotas, and despite several years now of rapid and significant improvements in American practice prompted by a hugely painful and costly bloodletting. Indeed, quite a few American plants are now beginning to reach recent Japanese norms, though too many others still have a long way to go.

What should be most striking is the fact that the European plants are well behind the American plants in their performance. Variable by critical variable, the story is the same. European automobiles are fundamentally -- not marginally -- more costly to make than Japanese cars and they are not as well made. They take twice as much direct labor, half again as much plant space, ten times as much costly inventory waiting around and, at the end, they have half again as many defects. (This applies to the European mass production producers: Volkswagen, Renault, Peugeot, FIAT, etc; the Custom Mass producers such as Mercedes and BMW are, despite ardent wishes to the contrary, no better situated and no better protected.)

Let me again stress that this huge and disquieting difference in performance is not due to more massive accumulations of capital in the production of Japanese cars, nor to newer machinery, nor to cheaper labor or even to tighter discipline. It is not a phenomenon of national culture. It is certainly not lodged in the culture of the workforce. (Management may be another question.) Witness the superior performance of the Japanese transplants in the U.S. which use American labor. The overwhelming difference in performance stems directly from a fundamentally different approach to the organization of production, that is, to the organization of

⁶ James P. Womack, et. al., *The Machine That Changed the World*, New York, 1990 (p. 13) Following the description of high volume flexible production or, as Womack et al call it, "lean production," draws heavily on that truly excellent study. I have found it to be the clearest and best documented presentation of the revolution in production, and am greatly indebted to the Womack team. I hope that more researchers -- and policy makers -- will quickly develop an indebtedness to their work.

the firm and the production process. Similar differences can be found in other industrial applications of complex manufacturing. More and cheaper capital, less and cheaper labor will not restore European competitiveness. We are dealing with a new mode of production. A fundamental reorganization of the production process is what is called for. And that is neither easy nor quick nor amenable to executive decree.

I. 4. High Volume Flexible Production:

Craft production came first. It was Europe's great strength. The craft producer uses highly skilled workers and simple but flexible tools. Products are customized to demand. Each unit is expensive. Claims are often made for their high quality, which usually resides in hard to measure attributes. But aside from special, luxury ingredients (equally available to velocity producers), and hang on features (also equally available), those claims, as in the case of "crafted" mass production European luxury cars, are over inflated.

Mass production began in the U.S. in the early 19th century with the production of interchangeable parts for guns in response to shortages of skilled gunsmiths. Almost a century later Henry Ford put all the pieces together: interchangeable parts; a minute division of the work process; complex, expensive and specialized machinery; a moving assembly line; highly trained and highly specialized people to design the product, and to design, organize and run the production process; and large numbers of unskilled (or low skilled) people to perform the simplest, most minutely choreographed tasks of making the product.

Fordism, as European sociologists are fond of calling this system, conquered the territory once occupied by craft production. Its economic advantages were simply stupendous: almost 90% less direct labor per vehicle when compared with the most advanced form of craft production (which used interchangeable parts) and unlike craft production it had a potential for steady improvement through automation.⁵ Fordism became the model of how to produce in an advanced economy and came (after World War II) to dominate European production as well. But not before creating a huge disparity in wealth and power between the U.S. and Europe. Mass production meant volume production of standardized products for what was an unusually

⁵ *Ibid*, figure 2.1. Again this description of "lean production" follows Womack. For an earlier and cruder description see Cohen and Zysman, *Manufacturing Matters*, 1987; see also Abegglen, *Kaisha*, (1985) and Imai, *Kaizen*, 1986.

homogeneous as well as vast market; and it made that market ever more homogeneous. It meant high productivity and high wages for unskilled and skilled labor and cheap, quality products -- formerly obtainable only by the rich -- to buy with those high wages. Around the mass production system a vast array of social structures came into being from the industrial union to defend workers conditions through the business school to teach "management," that is, the systematic coordination and measurement of complex organization at a hithertofore unknown scale. Mass production gave our institutions and even our societies their present form; that is the main reason it is proving so difficult to change in fundamental ways and at a vast scale.

Simply put, mass production was the greatest production system in the history of the world. It won the war; it won the peace by dissolving social conflicts in a rising tide of consumer goods. It catapulted America into a unique position of overweening economic, military, political and cultural power. It had, however, its weakness. It was terribly inflexible. Products could not be changed easily. Truly massive accumulations of capital, massive bureaucratic planning and, especially, very long production runs were its well known secrets. And the runs were long. In the heyday of the system, 1955, some seven million cars were made in the U.S.. And despite a plethora of models and styles some eighty per cent of those cars were variants of just six models.⁶ That was also the year when the U.S. auto industry produced almost three quarters of all the world's automobiles. Its share began to fall steadily for good, not bad, reasons. By the late 1950s recovery was long completed in Europe and mass production was taking hold. The European auto industry (as well as a broad suit of other industries) set out to copy the American mass-production model and that began to achieve their goals at Wolfsburg, Flins, and Mirafiori. They even began to imitate Detroit (though 30 years later) by importing cheap and supposedly docile foreign labor to take the assembly line jobs.

The real drama was elsewhere, in Japan, but it remained long concealed from American and European attention. One can just as well call volume flexible production or lean production the Toyota system or, in parallel to Fordism, Toyotatism.

In 1962 Detroit produced more cars in a week than Japan produced in a year. During the 1950s or sixties or even seventies Toyota had no possibility of successfully competing with Ford, or FIAT, Volkswagen, Renault or Austin. But they didn't have to. The Japanese government succeeded in keeping the Americans and the Europeans out of the Japanese auto

market. The foreigners could not import product; they could not establish subsidiaries to produce in Japan. They could only license technology, which eventually the weakest of them did. Without these thirty years of complete protection, Japan's story would be very different. Whatever neoclassical economists may argue, this is clearly a major case where protectionism worked.

The rest of the story, however, is a tale of inspired Japanese innovation. Eiji Toyoda and his brilliant chief engineer, Taiichi Ohno, are generally credited with masterminding the series of organizational innovations that cumulated in the volume flexible production system and the Japanese triumph in automobiles which lies behind the meteoric rise of Japanese economic, financial and technological power.

Aided, it turned out, by powerful constraints -- very little capital and a small market -- Toyota improvised some fundamental innovations. Instead of dedicating huge die presses to making a specific part -- standard practice in Detroit or Wolfsburg -- Toyota worked out ways to change dies quickly, ultimately in a matter of minutes, thus permitting much shorter runs and radically economizing on capital and on inventory. A first astonishing discovery was made: when all indirect costs were added up, it actually cost less per part to make small batches this way, by quick die changes, than to organize for dedicated equipment and enormous runs. But to do this necessitated passing responsibility and capability for changing dies to the line workers, not to specialized teams as in the mass production plants of the West.

This led to a second innovation that gave authority to stop the line to the line workers, something unheard of (to this day) in most Western plants. If something was wrong in a Detroit plant, it was put aside for re-work; the line kept moving (and defects kept piling up for re-work). Eventually, but not always, teams of specialists descended to analyze the problem and plan changes. At Toyota at the first detection of a defect, the line would stop; the work team would undertake a simple, but extensive diagnostic drill until they could find the cause of the problem and fix it. Eventually the Toyota line, which could be stopped by any worker, stopped less frequently than the American or European lines which are never supposed to stop.

The prize here was the end of the classic trade off: quality for price. Toyota got higher quality (no defects) at lower price. A Toyota plant now has almost no area of the plant at the end of the assembly line for re-work. An American or European plant has some 20% of the floor

⁶ *Ibid*, p. 43

space for this function which eats up some 25% of labor time! Those skilled craftsmen in white lab coats at the end of the Mercedes line, who are so prominently featured in the advertisements, are skillfully fixing defects. They shouldn't be there in the first place. Their work is all a waste. And this process amounts to over 25% of the direct labor (and probably more of the indirect labor).⁷ Jaguar is worse; it is a completely primitive mess. Their greatest investments in recent years have had to be in customer service; defects again, in gay profusion. By comparison with Renault or Mercedes, the Toyota line yields almost no defects. There is no re-work area. There are no skilled craftsmen either doing re-work at the end of the line or posing for advertising photos.

The emblematics of this revolutionary new production system are becoming well known: Just-In Time Production; Total Quality; Zero Defects; Rapid Cycle Time; Design For Manufacturability. Different companies are now experimenting with these new production innovations. Again, on average the Americans are way ahead of the Europeans. What they discover, if they do it right, is that these innovations are each different doors into the same system: a completely new organization of the firm and of its relations to supplier firms that dramatically shrinks the hierarchy (many fewer white collar jobs) and radically redistributes power within the enterprise downward, to the shop floor. It means a premium on formal skills in the work force; a radical reduction in the number of outside suppliers along with a new kind of working relationship between final assembler and supplier firms; and, possibly, significant locational perturbations as suppliers try to bunch up close to final users. Mostly it means radical changes in human relations and organizational structures in and around the companies. This is the hardest part.

High-volume flexible production deserves richer treatment. (Among the many descriptions, Womack et. al., *The Machine that Changed the World*, stands out for its clarity, its concreteness and its accessibility.) High-volume flexible production is a decisively superior approach to production in a broad set of industries, the industries that constitute the heartland of the European economy. It is not buyable in the sense of being lodged in tools and equipment. It is not easy to set-up in the sense that a few executive orders will close the gap. But there is no way to stay competitive over time without changing to high-volume flexible production. For the large organizations that dominate the European economy, the change will be, at best, painful and

⁷ *Ibid*, pp. 88-91

also generative of serious dislocations and problems. The fact that the Japanese auto producers out produced and reduced the American giants is well known, though its modalities deserve more careful attention than they have received. Table 5 shows that the European producers are in even worse shape than the Americans and, whatever they may think, they have not yet had the direct, blood-letting shock of massive direct competition to force them to improve, while, at the same time, depriving them of the means and the time to make those improvements.

II. America's Response to the Transition:

How has the United States economy responded to the basic transition in the international competitive environment driven by the radical changes in the extent of international competition, radical changes in the nature of international competition (the rise of the development state), and a revolution in the organization of production?

There is no single indicator of the competitive performance of a giant national economy, no proverbial bottom line. A large number of individual indicators, however, paint a picture -- like the pixels on the flat panel display that both U.S. and European companies seem to have such difficulty producing. The picture is not encouraging.

The most dramatic indicator of a troubled U.S. adjustment to the new dynamics of international competition is our gargantuan deficit in international trade. Table 6 charts its growth. A trade deficit, however, or even a deficit in current account is not by itself necessarily bad. The U.S. ran a trade deficit for well over the first hundred years of its existence, borrowing money in Europe to purchase the capital goods that permitted its rapid industrialization. But for almost 100 years, until the early 1970s, the U.S. ran a surplus in its merchandise trade. It has run a deficit since the early 1970s, and that deficit has grown to a hithertofore unimaginable and currently unmanageable scale.

The current U.S. deficit differs from the early U.S. deficit in two important ways. First, it is not the result of imports of investment goods that would in the long term improve the fundamental productivity of the U.S. economy and thereby provide the means for an improved U.S. trade balance and an re-equilibrium at the world scale. Second, its colossal scale threatens the stability of the world economy whether it continues at its present rate, or even if somehow the trade flow should suddenly and massively reverse and the U.S. balance turn positive.

America cannot continue to run such a trade deficit indefinitely. From the viewpoint of European exporters, this is a discouraging prospect. Indeed, unless there is a marked increase in the rate of economic growth in the world, especially in the nations we once called the Third World, it is hard to imagine Europe and Japan adjusting to a \$100 billion per year reversal in American trade flows. The first problem is simple to state, though difficult to answer: who would buy the products of an American export boom on the scale needed to bring the deficit down to zero? The problem gets truly horrendous if we add to that reversal a U.S. trade surplus of sufficient scale to reduce America's net foreign indebtedness. Yet, unless that colossal reversal happens the U.S. debt will continue to grow. It is one of many major time bombs ticking away underneath the international economy.

Table 7 shows the concomitant fall into deep debt of America's net asset position. The line traces an unprecedented descent from the world's largest creditor, up through the early 1980s, to the world's largest debtor by far by 1987. It should now be extended down past \$600 billion dollars. The real Debt-for-Equity Swap will not be between the U.S. and Latin America, but between Japan and the U.S. As the U.S. has a vast amount of purchasable assets, the game could continue for some time. The debt, however, can neither be written off nor paid off; it can only be "serviced" at steadily increasing amounts, imposing a growing effect on the U.S. commercial balance and an increasingly depressing effect on the U.S. economy.

The size of the trade deficit is a macroeconomic phenomenon; so is the debt. According to conventional economic theory, the deficit does not say much about U.S. competitiveness (although, a less conventional view would argue that it has enormous implications for economies of scale, the ability to invest, etc. and therefore does directly impact competitiveness). Whatever meaning one reads into the scale of the deficit, its composition says much about the competitive position of the U.S. economy.

Table 8 shows major declines in U.S. market share in a critical set of advanced technologies -- except for aerospace. (It also shows an even more pronounced weakening of Europe's position in these sectors adjusting, as it does, for intra-european trade).

Table 9 analyzes America's trade deficit with our major trading partners. Ignoring Canada and the OPEC nations as special situations (but of a very different nature), it shows no serious trade imbalance with Europe and a vast and seemingly intractable deficit with Japan and the NICs.

Productivity is the economist's favorite proxy for national economic performance. It is, ultimately, what makes for higher incomes and greater competitiveness. As table 10 indicates, U.S. productivity is still the highest; but table 11 tells a more interesting story. (It is also less vulnerable to the dangers of international comparisons.) It shows over a full generation, from 1960- 86, U.S. productivity increases lagging well behind all of the G-7 nations. In brief, it charts the squandering of America's enormous economic lead.

Investment rates (table 12) and R&D (table 12A) are major determinants of productivity: U.S. investment has been lagging, and continues to lag behind its best competitors. This year, Japan will have invested about two times as much per capita as the U.S..

Savings rates (table 13) do not determine investment rates, and in an open world economy they should not very significantly affect the cost of capital. But they do. Note for the U.S. the period after 1980 when the Reagan administration began its policies favoring private savings. These included measures to cut social spending and spending on public infrastructure; a major increase in the inequality of income distribution; high real interest rates, and a radical reduction of upper income taxes.

Real Wages (table 14) in the United States have not increased at all since the early 1970s; they are now no higher than in the early 1960s; and they fell, in absolute terms, during the 1980s. With a few brief and painful exceptions, this is the first time in some 200 years that this has happened. The American constitutional bargain is predicated on the assumption of permanently rising real wages. The promise has not been honored, and the future does not promise a major reversal. The comparison with Europe and Japan is striking. It was not high and growing wage costs that eroded America's international trade position. The stagnation of real wages may have had a more telling effect on savings rates than the increase in income shares going to the top 5% or even 10%.

Finally, education (tables 15 and 16). In a world where capital moves at electronic speeds and technology leaks very quickly, how does a nation stay rich and powerful if it is getting relatively more dumb than its competitors. Note please the performance of the Asian NICS: these are no longer sources of cheap unskilled labor; their labor forces are in many ways more skilled than those in the U.S. and Europe, and their performance, in many high tech areas superior to that of Europe, is directly related to their educational attainments.

Together these indicators, however imperfect they may be, sketch a portrait of a troubled U.S. response to the new challenges of the international economy.

III. The Response of U.S. Policy Makers?

The response of U.S. policy makers to this poor competitive performance by the American economy is difficult to chart. There has been no clear and vigorous strategic response -- certainly no positive one. But at the same time there has been a certain passive consistency and a strategic reinforcing of ideological barriers to discussion and action.

We can isolate three themes -- if not strategies -- that constitute America's policy response:

1. The first set of elements in U.S. policy was an array of measures, presented as a crusade. These aimed at: a) Deregulating markets in such critical areas as telecommunications, air transport and financial services (banking, brokering, etc.). After a dramatic start, the long term negative effects soon began to be felt. The severely weakened position of U.S. air carriers and banks is becoming better known every day.⁸ b) Efforts to break unions, lower real wages, cut social expenditures, redistribute income towards the top. Breaking unions and lowering real wages were supposed to make American enterprise more efficient and more dynamic; lowering taxes, especially at the top, was supposed to spur initiative and to generate higher levels of savings and investment, thereby increasing competitiveness, the level of national income and, as a second order effect, increase government tax revenues without raising tax rates. As indicated above, none of these objectives was realized; wages fell, inequality increased; but savings declined, investment stagnated, competitiveness weakened and government revenues did not increase. The government did not become smaller; it did not become less intrusive or more efficient. A newly invigorated automatic market economy did not sprout up fresh from the burnt forest of the mixed economy. The State did not wither away: it grew bigger and more intrusive but ever less able either to act strategically and effectively or to achieve justice. Legitimacy declined along with efficiency.

⁸ Telecommunications poses a more subtle set of questions. See Borrus et al "Information Networks and Competitive Advantage," BRIE/OECD Telecommunications Study, Paris, October, 1989.

2. The second element is the vigorous repetition of an argument echoed by mainstream American economists that contends that we do not have a competitiveness problem; we have a macroeconomic problem, an imbalance of savings and spending that necessitates massive foreign borrowing and therefore, by definition, results in large trade deficits. Cut the deficit (or, in its more sophisticated version, up the savings rate) and the trade deficit will vanish. The real truth contained in this statement comes from the power of an identity.⁹ It does not come from causal analysis. The identity also works in reverse: the massive trade deficits necessitate foreign investment and borrowing as the dollars piling up abroad have no where else to go. Let's accept as given that the scale of the trade deficit is a macroeconomic phenomenon. On a policy level, nothing whatever has been done to change macroeconomic conditions. The government refused to increase taxes, and declared social security and defense spending to be inviolate. Interest payments, by definition, cannot be cut. That left less than 19% of total federal spending to absorb any contemplated cuts; not enough in its entirety to eliminate the deficit, and including such critical governmental activities such as the White House staff, air controllers, Drug Enforcement, as well as various programs with large constituencies such as federal contributions to school support, crime control, agriculture, water, welfare, etc. The policy approach was not merely disingenuous, it was irresponsible. But the combination of vehement insistence complete with resolute inaction on the macro question did achieve one important strategic goal: it prevented any new thoughts and any new policies. It insisted that all that was needed was a strong dose of traditional, unpleasant medicine, and then withheld the potion. Such fundamental new approaches as a strategic trade policy, an industrial policy, a technological development policy in an age of Spin-On rather than Spin-Off (when civilian technology is ahead of military technology and dependency is reversed), or a manpower policy found no place in the higher councils of the administration.

Price sensitivity seems to be play an unconventionally small role in the U.S. trade deficit, and this, of course, limits the effectiveness of macro policy. A devaluation of the dollar should certainly reduce the trade deficit, traditional theory holds, if the devaluation is major and the new rate held for an extended period of time. It didn't; at least not against Japan. Massive devaluation of the dollar against the yen did not significantly change the U.S.-Japan trade deficit

⁹ $X + T = NFI = S - GD - I$ where NFI is net foreign investment, X is trade balance, T is services, interest and transfers, S is savings, I is investment and GD the government deficit.

at all. In 1985 the dollar hit a dizzying high of 245 yen to the dollar, and the U.S. ran a trade deficit with Japan of about \$1 billion per week. By 1988 the dollar had fallen by almost 50% against the yen, to 125 Yen per dollar, but the trade deficit had not moved: it still ran about \$1 billion per week. (We might note that U.S. trade with Europe did respond to changes in exchange rates, see table 17, underscoring, in an empirical way, the new nature of international trade and the importance of not relying on traditional analysis and traditional policy tools to conceive and implement strategy.)

3. The third major theme of U.S. policy is one that has gained much currency in Europe. It is the idea that what is happening in the U.S. economy and in Europe is not so much an unwelcome but remediable deterioration of industrial activities as a movement toward a post-industrial economy of advanced services and high tech. President Reagan trumpeted this agreeable theme: "The move from an industrial society toward a 'post-industrial' service economy has been one of the greatest changes to affect the developed world since the Industrial Revolution. The progression of an economy such as America's from agriculture to manufacturing to services is a natural change".¹⁰

The New York Stock Exchange shared that view: it declared that "a strong manufacturing sector is not a requisite for a prosperous economy."¹¹ Segments of the business press expressed similar views; *Forbes* magazine was most graphic: "Instead of ringing in the decline of our economic power, a service-driven economy signals the most advanced stage of economic development... Instead of following the Pied Piper of 'reindustrialization,' the U.S. should be concentrating its efforts on strengthening its services."¹² (In passing, we might note that America's GATT round strategy is predicated on this view that our future is in services and high tech. Along with a mid-eighties strategy of seeking through GATT a backdoor approach to fostering deregulation abroad).

The problem with this commonly expressed view is that it is, quite simply, wrong. Worse, it is richly generative of disastrous policy.

¹⁰ Office of the U.S. Trade Representative, *Annual Report of the President of the United States on the Trade Agreements Program*, 1984-85, p. 43

¹¹ New York Stock Exchange, *U.S. International competitiveness: Perception and Reality* (New York: N.Y. Stock Exchange, August 1984), p. 32

¹² *Forbes*, April 11, 1983, pp. 146, 149. For a more academically respectable voice carrying the same message to a broad public, see Gary S. Becker, professor of economics and sociology at the University of

Mastery and control of manufacturing is critical to a large, non-niche national economy. This fact, which should be central to policy-making, has been obscured by a popular myth that sees economic development as a process of sectoral succession: economies develop as they shift out of sunset industries into sunrise sectors. Agriculture is followed by industry which in turn is sloughed off to less developed places as the economy moves on to services and high technology. Simply put, this is incorrect. It is incorrect as history and it is incorrect as policy prescription. America did not shift out of agriculture or move it offshore. We automated it; we shifted labor out and substituted massive amounts of capital, technology, and education to increase output. Critically, many of the high value-added service jobs which we were told would substitute for industrial activity are not substitutes; they are complements. Lose industry and you will lose, not develop, those service activities. These service activities are tightly linked to production just as the crop duster (in employment statistics a service worker) is tightly linked to agriculture. If the farm moves offshore, the crop duster does too, as does the large-animal veterinarian. Similar sets of tight linkages -- but at vastly greater scale -- tie "service" jobs to mastery and control of production. Many high value-added service activities are functional extensions of an ever more elaborate division of labor in production. Conventional statistics are blind to this relationship; so is input output analysis. The shift we are experiencing is not from an industrial economy to a post-industrial economy, but rather to a new kind of industrial economy.

III. 1. High Tech

The second axis of the post-industrial view focuses on high technology. It begins from a curious and ill-informed perception of high technology. It sees it as fundamentally a laboratory activity. In the U.S. policy makers discuss high tech as though it is properly undertaken by eccentric persons in white coats at Berkeley or, (for second rate stuff), at MIT or Stanford. The entrepreneurial variation of this view sees weird youngsters renting Steve Jobs' garage in Silicon Valley to invent some improbable gadget. In all cases it is an activity that is quite separated from the economy, and especially divorced from production. Few other views are quite as destructive of an advanced economy. Science -- not advanced technology -- is done that way, in the Berkeley labs. And it diffuses through its own channels, usually worldwide and instantly.

Chicago, who writes: "...Strong modern economies do not seem to require a dominant manufacturing sector" (*Business Week*, January 27, 1986, p. 12).

Technology development, and high tech industry is another story entirely; it is tightly tied to mastery and control of production to such an extent that if you lose control of production, in a few generations -- and in electronics a generation is about 2 to 3 years -- you lose your technological lead. No ands, ifs or buts.

A firm cannot control what it cannot produce competitively. There is little chance to compensate for production weakness by seeking enduring technological advantage. A production disadvantage can quickly erode a firm's technological advantage. Only by capturing the "rent" on an innovation through volume sales of a product can a company amortize its R&D costs and invest in R&D for the next-generation product. The feeble American presence in the current generation of consumer electronics indicates the cost of failure to produce competitively in the previous generation. Finally, if a firm simply tries to sell a laboratory product to someone else to produce, the value of the design is lower than that of a prototype, and prototypes are valued lower than products having established markets, as each step toward the market decreases uncertainty. A producer with a strong market position can often buy a portfolio of technologies at a low price and capture the technology rents through volume sales. Just as for the economy, for the firm, manufacturing matters.

America's recent history in high technology has not been happy; in just a few short years we have lost our unchallengeable world leadership, and our position continues to decline. America still has the world's largest electronics industry, and in many segments the most advanced, but it is rapidly approaching number two status. Europe's position is even worse.

III. 2. Electronics

Let's survey in somewhat greater detail the most important of the high tech sectors, electronics. Along with new (or advanced) materials and biotechnology, advanced electronics is at the top of every list of the industries of the future. But unlike those other core technologies of the future, advanced electronics is not just an industry of the future. It is already one of the biggest industries of today, perhaps the biggest depending upon definitions. Shipments of U.S. electronics producers passed \$200 billion in 1987, about the same size as autos, about 2 1/2 times aircraft. (See table 18). And they were growing by over 10% per year. Electronics directly employs about 10% of the manufacturing work force, amounting to over 2 million U.S. workers. This data on the current size of the U.S. electronics industry does not include consumer

electronics (televisions, VCRs, tape recorders, Camcorders, disc players, phonographs, etc) or the vast number of supporting jobs in other companies that do things for electronics companies like software programming, systems analysis, equipment repair, etc. Productivity gains in electronics run well ahead of the industrial average. Electronics is capital intensive, exceeding all manufacturing by a wide margin. It is also research intensive. It spends more than any other industry on R&D (amounting to some 20% of all industry R&D spending); it is responsible for over 1/3rd of all patents issued in the U.S.. Both the rate of R&D spending and its share of patents keep growing.¹³ It is also an industry that is overwhelmingly located in the advanced nations with over 90% of output located in the U.S., Japan, Europe and Singapore, Taiwan and Korea. These NICS account for about 6%.¹⁴ In this sense, as in many others, it is not like shoes or textiles or steel or plastics or even autos.

Electronics has several distinguishing characteristics. The first is that though it is a giant industry, like autos, or chemicals there is no such thing as unadvanced, or traditional electronics, however national statistical offices and financial analysts may choose to slice up their categories. The technology simply moves too quickly. A five year old semiconductor is more like Ford's Model T than it is like a five year old car. A three year old Camcorder suffers from surprising and unacceptable giantism. Like the digital technology inside the box that operates as either a 1 or a zero with nothing in between, electronics is either advanced or it is defunct.

The second characteristic is that there is a chain of dependency up and down the electronics sector. Put most simply, is it possible for an independent U.S. or European company to make a better computer and get it to market faster than Hitachi if it makes its computer with Hitachi semiconductors? Or is it possible for a European chipmaker to make a better semiconductor than Hitachi and get it to market faster than Hitachi if that semiconductor will be made on Hitachi chip making equipment? The answer, for prudent policy makers, must be No. And to complicate matters even further, the rate of technological change is such that one is quite ill advised to take demarcations between segments (televisions, computers, telecommunications; systems and chips) very seriously. As electronics goes digital these distinctions are likely to vanish overnight and companies or corporate groupings who are very strong in the core

¹³ Data from U.S. Department of Commerce, *The Competitive States of the U.S. Electronics Sector*, April 1990.

¹⁴ *Ibid*, table 8.

underlying technologies, and powerful, lean manufacturers, such as Matsushita or NEC will quickly move into market niches occupied by companies who do not have a strong position, or a system of strong allies, in key underlying technologies such as advanced semiconductors.

The third characteristic is that to the extent that such a thing exists, electronics is the classic strategic industry. It is characterized by large and important externalities, by rapid and multidirectional technological spin-offs, by formidable economies of scope, scale and learning. Some of these can be captured simply by purchasing products and applying them well; many cannot. European strategy in electronics will have to be guided by these three characteristics. Europe must be present in electronics in a big way; it must stay on the cutting edge of both technology and velocity production to get those products to market; and, most difficult, in order to do this it must reexamine the sector very carefully to decide what it must produce, what it can afford merely to purchase, and how to arrange its presence strategically. American policy makers have been impressed by none of this strategic analysis.

America entered the 1980s with a strong technological lead and dominant market position in most of the many segments of electronics (except for consumer electronics, televisions, etc. which amounted in size to about one third of the computer segment, was growing more slowly than computers or semiconductors, and was assumed to count for much less in terms of technological sophistication). see table 19.

Europe entered the 1980s with more size than strength in consumer electronics, and found itself increasingly lagging behind their best Japanese competitors (and increasingly exposed to new Korean competitors). But Europe -- unlike the U.S. -- managed to hold on to its final market in consumer electronics (or at least the television segment); it lost many of the newer ones. In televisions in recent years, European producers have made significant improvements in their capabilities. Europe also has shown important strength in special applications, cleverly incorporating electronics into European made production machinery, transportation equipment, specialized equipment, and into various stages of the production process. It entered the 1980s with distinct weaknesses in semiconductors and computers. It enters the 1990s probably relatively worse off and facing an immediate crisis as Europe's former national champions, now promoted to European champions, teeter on the verge of either collapse in the face of accelerating international competition or acceptance of complete technological dependence on those foreign competitors. More often than not, this dependence is in components from firms that will also be their principal competitors in final systems -- the worst form of dependency.

Tables 20 through 23 show world position in semiconductors. Note in table 20, along with America's declining share and the persistent failure of Europe to rally, the striking shift of Korea's position in semiconductor production, coming up from nowhere to begin to challenge Europe (not just one European country) in total semiconductor production. Note, also, the data on semiconductor consumption. Semi consumption may tell a more important story than production. Japan's share keeps rising; Europe's doesn't. Korea's semiconductor consumption rose even faster than its surge in production. Semiconductors, unlike beef or autos, are not consumed by individuals; they go into things. Generally, if you are not putting many semiconductors into the product you make -- and into the production system you use to make them -- you are making the wrong things in the wrong way. Europe's relatively very low and relatively declining position in the consumption of semiconductors is a most serious indicator of a troubled European position in electronics.

The future does not look brighter. In the past three years national positions in emerging technologies, that is, technologies for which large markets do not currently exist but which will be of great economic importance very soon, have been examined in a series of independent studies. Each has a slightly different list of technologies, and there were several important

differences in ranking. But overall the picture was quite consistent. One after another the reports sounded alarms as they documented the erosion of America's position in advanced technologies and tried to alert American policy makers to the consequences. The latest report from the U.S. Department of Commerce is indicative.

It finds that not only is America losing its lead, but that the U.S. now trails behind Japan in: Advanced Materials, Advanced Semiconductor Devices and Processes, Digital Imaging Technology, High Density Data Storage and Optoelectronics.

The U.S. still leads Japan in Artificial Intelligence, Biotechnology, Flexible Computer-Integrated Manufacturing, Medical Devices and Diagnostics and Sensor Technology.

It is important to note that those reports place the U.S. behind Europe in only one of these technologies, Digital Imaging Technology.¹⁵

The U.S. has not mounted an organized response to its threatened position in electronics. Europe has; but, clearly, the results are such that it will have to try something different very quickly. America simply abandoned the consumer electronics segment; recent talk about organizing a re-entry strategy around flat panel displays and digital video is met with cold indifference, if not hostility, from the White House and a lukewarm response from industry. Only in conjunction with major foreign competitors, (and there are only a few: Philips and Thomson from Europe or any of the big Japanese) will American players re-enter that increasingly important segment, and then only in a limited way, perhaps in signal processors and, hopefully, displays.

In the other major segments -- semiconductors, semi conductor equipment, computers, display, optoelectronics, etc. -- America has refused to mount a strategic response to its eroding lead, despite a plethora of warnings from industry, blue ribbon commissions, the Pentagon and informed observers of the sector. Some small and isolated efforts such as Sematech, and the U.S.-Japan semiconductor agreement have received massive publicity. But in themselves, they are too small to matter and should not be taken as the tip of any American policy iceberg. This lack of a government led response has become more important, given the existence of enormous government led efforts in Europe, Japan and Korea, and given the fact that the U.S. government's traditional method of intervention -- the Defense Budget-- no longer seems very effective in advanced electronics. Civilian technologies can no longer depend upon the military sector as a

source of technology and early development. Indeed, the relationship has reversed: spin-off, (using military technology in the civilian sector) which played such a powerful role in the infancy of semiconductors, computers and jet aviation, to name a few, has, for the moment at least, ceded its place to spin-on, and the U.S. military finds itself, like U.S. and European electronics firms, increasingly dependent upon Japanese civilian based technology for its latest military technology.

The response of America's policy makers to the challenges of the new international competitive climate, in high tech as well as traditional industry, has been ineffective at best, destructive at worst.

What has been the European response?

IV. Europe's response: Some Observations

One could argue that the sudden acceleration in the movement for European unification -- in shorthand, Europe '92 -- was, to an important extent, a response to the changes in international competition I have outlined here. After all, it is no secret that European industry would gain efficiency and power from a clean and single giant market. But that was equally true and equally clear twenty years ago, or fifty years ago, when Europe was worrying about its ability to compete with giant, American mass manufacturers. And for more than five hundred years everyone has known that a unified Europe was a good idea, the only idea. Dante was perhaps the most eloquent exponent of European unification. The real question is not "Why Europe?" but rather, "Why Europe Now?" To exaggerate more than just a bit, Europe '92 is a response to the rise of Japan. Of course, it is overwhelmingly a response to bigger, more complex and more indigenous forces. The movement for European integration has now moved beyond the narrow group who generated the sudden impetus in the mid-eighties, into the realms of high politics and popular politics. But there is some truth, and much utility, in placing the sudden impetus to unification on a realization by critical segments of the big business and policy elites that the rise of Japan as an economic, financial and technological power was effectively ending the post-war international order of a bi-polar world. Europe's role in that world order was comfortable, albeit somewhat demeaning. It played second fiddle, depending upon and following American military, financial, economic and technological leadership. Being second to the U.S. was one thing; being

¹⁵ See, Department of commerce, Technology Administration, "Emerging Technologies", Spring 1990.

third, behind the U.S. and a vigorous new Asian colossus of still undefined configuration and intention, was something altogether different. Add to that the central meaning of this realignment of world power: a relative decline in American financial, economic and technological power plus complete eclipse of the Soviet's. Europe's accustomed place -- seated on the coat tails of Uncle Sam -- ceases to be quite so comfortable when the giant gives signs of weakening and wanting to sit down.

Europe '92 is at the heart of Europe's response, and it is an epochal and wonderful response. A few years ago when the Europe '92 movement first gathered steam it presented something of the quality of a Rorschach blob, on which the Europeans projected their hopes and the Americans (and Japanese) projected their fears. Today, a better informed reaction is becoming possible. The movement for European unification is a necessary response to the new competitive environment (as well as other, more important things). But as far as international competition goes, it is not sufficient. 1.) Creating a bigger, more uniform market to facilitate Japanese penetration through their decisive competitive advantage in a critical array of industries such as autos, and electronics, with entry strategy aimed at playing one government off against the other, was not the original intention, but could be the ultimate outcome. 2.) Creating a giant single market for Europe's mass production industries, and encouraging them to cooperate, consolidate and invest more intensively in traditional mass production, will not change Europe's competitive position one bit; it may, indeed, exacerbate the problem. 3.) Finally, a simple Maginot line of protection -- even at the new European scale -- will not work.

In many ways the new Europe is flirting with each of these responses simultaneously. For many good Europeans a single market meant just that: open up the Old Continent to a mighty and invigorating blast of free market competition from whatever direction the wind might blow. The invisible hand would then knock over generations of barriers to efficiency and, ultimately, arrange the pieces to Europe's advantage much more effectively than would any imaginable (not to mention attainable) governmental guidance. In this view, Europe '92 represents a chance not only to remove the old structures of government intervention from the industrial arena, but also a chance to dismantle the elaborate and costly European welfare state. The combination of a large and free market, with new economies gained from removing barriers and frictions and from increasing scale, along with a reduction of the high costs of the welfare state, would invigorate the economy and raise both living standards and Europe's economic power. Seen from the great

distance of California, this current of European force seems much more powerful today than one would have earlier guessed. The very serious difficulties that are now surfacing in Europe's long protected and assisted advanced electronics sector, and the need to do something and something different in that area, could well give it further impetus.

This attitude is, of course, a variant on the American experience. Nonetheless, however the political dynamics play themselves out, in Europe as in the U.S., all protectionist barriers will not fall. In the U.S., new ones have been going up at a goodly rate. But one tenet of the creed was respected at all costs: protection had no strategic function. It was strictly a series of *ad hoc* responses to political pressure and, as a result, generated little long term good to compensate for its short term costs.

There is, ultimately, no way Europe will remove all barriers to penetrating its market. If it did this, for example, in autos, there is a very good chance that the mass producers such as Renault, Peugeot, FIAT and Volkswagen, and also such speciality mass producers as Mercedes-Benz, would suffer fates as dire or even worse than those experienced in the U.S. by GM, Ford and Chrysler. And so too would their respective regions and economies. The Japanese are perfectly able to demolish the European auto makers. Their cars are cheaper, and better, and getting more so every day. But political and economic pressures for a fully open European market may not be so strong. After all, who wants to open it? The Americans claim they do, but U.S.-European trade has not been a serious problem of balance for many, many years, and will not become one. Outside a few small, but troubling, industrial areas, calm should be made to prevail. Reasonable diplomacy by European leaders should avert the worst international implications of a non-fully-open European market. U.S. auto makers do not want to "open Europe:" they are there already, and have been for well over 50 years; they rightfully see themselves as good Europeans, threatened, like their colleagues, by major market openings. Indeed, they see themselves as perhaps the most threatened because no government will keep supporting them.

Major U.S. electronics companies are also already well installed in Europe, and for them their strong position in Europe is a matter of life or death. They face extinction if the Japanese take the European electronics industry. Even the Japanese government talks of limiting Japan's share of the European auto sector, knowing full well that it will never be allowed to take the full share its competitive strength would now yield up, and wisely seeking to avoid unseemly and

uncontrollable crisis reactions by the Europeans -- who are not likely to be as moderate in their reactions as the Americans. The tricky questions will not be at Europe's borders, except, perhaps, for one: exports from Japanese transplants in the U.S., overwhelmingly autos, auto components and electronics. Here there is much at risk for both Europe and the U.S. (and little for Japan). A clear and strict European determination of what is -- and what is not -- an American Honda, or FAX machine would be in the best interests of both countries. A major trade fight that sets the U.S. government as the representative of Japanese industry against the Europeans would be as unfortunate as comic. It is, however, not to be excluded. The significant diplomatic burden will, for the while at least, be primarily on European statesmanship.

Another major current is, of course, outright, full-blown protectionism with its usual rhetoric of job counts and "adjustment periods." This view, I believe, is more credited outside, than inside, Europe. But it is always a real possibility, able always to find a real constituency. The real vulnerabilities of key European industries re-enforces this position and makes it, ultimately, part of a final determination. That is, European protection will be maintained, or enhanced, in quite a few critical areas including the two we have chosen to focus on.

Europe needs a strategic response at the European scale. That response will rest on the scale and internal openness of the single market, but it will also entail substantial amounts of State action at the European scale to protect and, critically, to change, the structure of European industries in profound ways.

Europe will have to hold on to and strengthen its position in advanced electronics. To date, the first strategy has been the chosen approach: Use the new scale of the European market to consolidate the old national champions into European champions through consolidations, subsidization, and protection. This strategy has not worked very well and it is in imminent danger of collapse along with the industry. Bigness may well be an important attribute of successful electronics firms, but it is not the same thing as strength. Consolidations produce Bigness but not necessarily strength: witness, in the U.S., Unisys, the ailing consolidation of Burroughs and Sperry, a computer maker bigger than any European, and also a company not likely to survive much longer. GE and RCA -- especially after their merger -- provide another example of forging, through consolidation, an integrated electronics giant, that quickly exited both consumer electronics and semiconductors deciding that it was unable successfully to compete against the Japanese. Neither scale nor a lack of integration was its problem.

In electronics, Europe has some difficult determinations to make quickly. It must hold the sector, but it cannot hold all of it by itself. So it must decide what is essential to produce and what can be safely purchased. The problem will be made more difficult by the intractable fact that some segments will be much, much harder for the Europeans to sustain a cutting edge presence in than others, and some of those are the most attractive. Whatever strategy -- or strategies -- are adopted, foreign based companies and joint ventures with foreign based companies will play essential roles. Here, I would like to refer back to section I, above, that discussed differences in foreign based companies, and strategies for hosting foreign based multinationals, for they are not all the same for all purposes.

Europe, for example, need not worry about a European presence in those advanced electronics products and technologies that are available from a great many companies in many countries. These are close to commodities. Here no policy, no strategy, is needed. They should be purchased in the world market at the best prices and used by European companies in their final systems. Products made by just a few companies are more troubling, but they may be prudently treated by the same "Buy" strategy. Products made by just a few companies, but all located in one foreign country create much greater vulnerabilities. Products made by one or just a few companies all located in the same foreign country when those companies are direct competitors in the final systems in which those components are used create fatal dependencies.

The European computer industry is currently crumbling. The technological dependency of ICL on Fujitsu had become so extreme that there was no way it could introduce a next generation of product without becoming simply a *de facto* value added distributor for Fujitsu, a relationship it has just formalized to the consternation of Bruxelles planners. Bull, despite its large budget and substantial success, risks finding itself in a similar position *vis a vis* NEC. Nixdorf had to be absorbed by Siemens, which at huge effort and enormous cost seems to be holding on, while Olivetti and several other European electronics names are terribly dependent for their core components and technologies on the small group of Japanese companies that are their competitors in final systems. The same is true for many successful U.S. computer and instrument companies: look inside Compaq's very successful laptop; there is very little Compaq present. Or try Apple's laser printer, or most anyone's for the matter. Advertising to the contrary, no American company even makes a fax, or a VCR.

Willy-nilly there will be substantial direct investment in electronics in Europe by the Japanese Keiretsu companies. Europe should demand that they do R&D, product development, full production of the core components and next generation product as well as production in Europe, and that those technologies diffuse broadly and quickly throughout the European production system.

A safer approach would be joint ventures with electronics companies that are not direct competitors to the European producers in their final systems markets. The American merchant semiconductor companies remain (outside the important memory segment) at the leading technological edge. Such companies as Harris, Texas Instruments, Motorola, Intel, AMD, National and many other smaller outfits will not survive if they do not sustain their major shares of the European market. If they do not survive, technological dependency upon the Japanese Keiretsu companies in critical componentry will be quasi-complete. That is the worst form of industrial foreign relations for Europe. There are natural alliances -- in consumer electronics, computers, automobile electronics, smart power, medical equipment, diagnostics etc. -- between such American and European companies that would meet these criteria and strengthen both sides. They should be vigorously encouraged.

IV. 1. Eastern Europe

The second epochal (to use that big word again) element of Europe's response is not exactly a response, not something that Europe did, but rather something that happened to Europe. Europe suddenly inherited a vast hinterland to the East and must now decide what to do about it. Eastern (or, perhaps, Central) Europe poses a dizzying challenge to Europe. After all, it will be Western Europe that takes responsibility for aiding and steering development in those benighted lands and Western Europe that bears the major risks if development there fails. This is a major challenge and, of course, a major opportunity. Eastern Europe has all those educated and dutiful workers that the Western European economy needs. It is also a great new market that could provide years and years of respite from the international competition we have been discussing: let the world split up into trading blocs; Europe is in the best neighborhood.

But like the giant single market the vast reserves of cheap labor and untapped, unsophisticated demand to the East offer a dangerous temptation to Europe. The obvious strategy is to make the Oder-Nisse into the Rio Grande, leapfrog Portugal, Andalusia and Southern Italy and establish in the East, a step at a time, a vast network of cheap labor industrial

plants under the control of European companies; simultaneously import large amounts of cheap, docile and easily assimilable industrial labor from Eastern Europe into Western Europe's older industries, perhaps to replace recently imported labor that is proving difficult either to assimilate or ignore.

This temptation of facile response corresponds quite well to what the U.S. economy did, though in less formal ways, over the past twenty years to what should be its profound regret. American companies, including good ones -- once great ones -- in electronics and autos as well as lesser industries moved production a stage at a time -- starting with low end unskilled tasks and ending up now with very high end, high skilled tasks -- off to cheap labor reserves in the Pacific. There they availed themselves of labor that was cheaper and more dutiful (and, quickly, better educated) than what was available in Eastern Europe. And they did it without waiting for massive infrastructural investments. Infrastructure developed *pari passu* with the electronics industry. Today, in Eastern Europe infrastructural needs are less; some cellular phones will do the communications job; you don't have to wait for full blown telecommunications systems anymore. And Eastern Europe is nearby -- not like the distant Pacific of the late sixties and early seventies; travel is easy. With great resourcefulness, RCA sought cheap labor and "high end niches" as its primary response to early Japanese competition in the low end of consumer electronics. It got what it sought: good cheap labor. It reinvested offshore, in its traditional approach to production, and lost everything to the Japanese who were not allowed to run abroad after the cheapest labor and who, instead, managed to situate themselves on a new production trajectory. This path eventually led to absolute domination of that sector and substantial advantage in other segments such as semiconductors, displays, new consumer products and, ultimately, computing.

For companies in the industries we are focusing on, autos and advanced electronics, the cheap labor strategy has not worked. For countries like the U.S. or the European nations, it cannot work. The American competitiveness problem outlined above, like Europe's, is not fundamentally with cheap labor countries. It is with Japan where wage costs no longer significantly differ from those in the U.S. or Europe. A low wage European strategy to compete with high wage Japan in autos or electronics is, on the very face of it, defeatist, and it will lead, as the U.S. effort has led, to defeat. After all, American producers ran to cheap wage locations and lost market share and technology leadership. The U.S. encouraged (or at least permitted) a

vast immigration of cheap labor. And the Reagan administration tried (with somewhat less but nonetheless real success), to dismantle major portions of our social support system. We even disinvested in the physical public infrastructure. America actually succeeded in lowering average wages over the past five years, and in keeping them constant in real terms over almost twenty years. All in all, a political *tour de force* that Europe would be hard pressed -- and ill-advised -- to attempt. And it was all for naught. In the sectors we have focused on the advantages from lower wages proved not to matter. Even an almost fifty percent drop in the dollar did not help. In other industries like apparel the wage squeeze was simply not big enough.

Europe is and must remain a high wage producer. It must increase, not diminish, its investments in education and radically improve the efficiency of those investments. In a world where capital moves at electronic speeds and technology leaks quickly how can a nation stay rich and powerful if its people become dumber than the others. America is not succeeding in answering that question, though it gives the impression of trying mightily. There is no answer other than the obvious: it can't. Mass production provided an out: it provided high paying jobs to low skilled, low educated people. The emergent mode of production, volume flexible production, offers no such protective shelter. It relies fundamentally on formal (not traditional craft) skills, on the ability to interpret symbolic data, often in mathematical form, into action. That means real, formal education.

Before Europe, in a futile quest for lower costs, sets out to dismantle its social protection system, it would be well advised to study the productive ironies of America's cost savings in such critical areas as child care, health, and social stability. These complement education and, like education and telecommunications, should be seen in the context of a realistic image of a modern production system. The old system had at its center a massive accumulation of capital in which a great many highly intelligent, highly educated people designed products and production systems in minute detail in which many more uneducated and low skilled people labored very productively to make masses of products which their high wages permitted them to consume. Production happened inside the plant and was, in the context of reasonable public order, controllable to a critical extent. I suggest that a new image of the production process guide social policy making. Production is closer to a network in which productivity is determined by the skills and attitudes of the person on the other end of the communication line. It is not easily

contained within the plant, or even the firm, however big. If he (or she) is incompetent, so are you.

For reasons that elude reason, it seems very difficult for one great nation to learn from the mistakes of another. Europe has much to learn from America's experiences these past years. I hope it can do that without repeating them.