How Institutions Create Historically Rooted Trajectories of Growth

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This paper is concerned with approaches to growth theory that argue for historically created, institutionally rooted national development trajectories. There are varied ways of organizing market economies, and there is more than just one kind of capitalism. The institutional approach begins with the observation that markets, embedded in political and social institutions, are the creation of government and politics. Indeed all economic interchange takes place within institutions and groups. Markets do not exist or operate apart from the rules and institutions that establish them and that structure how buying, selling and the very organization of production takes place. Consequently there are multiple market capitalisms, and in a global economy international competition among members must be understood as an interplay of these various national market systems. Focus is on the historically rooted national institutions which frame the choices of individuals and structure the terms on which issues such as agency problems and contract problems are confronted. The approach proposed in this paper is a necessary complement to an institutionalism more familiar in economics. This historical institutionalism frames problems and provides answers to puzzles that concern microeconomic-based institutionalism. The particular historical course of each nation's development creates a political economy with a distinctive institutional structure for governing the markets of labor, land, capital and goods. The institutional structure induces particular kinds of corporate and government behavior by constraining and by laying out a logic to the market and policy-making process that is particular to that political economy. These typical strategies, routine approaches to problems and shared-decision rules create predictable patterns in the way governments and companies go about their business in a particular national political economy. The paper then applies these notions to the debate about national systems of innovation. Empirically there is evidence of distinct national technological trajectories. The questions are why the trajectories exist and why they have particular form. National systems arguments need an institutional theory that would permit us to apply both evolutionary and new growth arguments about economic development to particular national cases.

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1. *Introduction*

The approaches to growth theory presented in this volume open the possibility that there are historically created, institutionally rooted national development trajectories. Romer's argument distinguishing between the economic properties of 'ideas' and 'things' or Stiglitz's information argument undermine any notion of a single equilibrium. The evolutionary arguments of the Nelson and Winter (1982) variety suggest rather a particular national path. The reasoning about paths or trajectories opens out to notions of institutionally mediated paths of growth. The approach to institutional analysis presented here helps account for the persisting diversity in the organization of capitalist economies and the institutionally mediated paths of national economic development. There are then varied ways of organizing market economies; that is there is more than just one kind of capitalism, more than just one course of development which some countries travel more quickly than others.[1]

The institutional approach begins with the observation that markets, embedded in political and social institutions, are the creation of government and politics (Polanyi, 1944). Indeed all economic interchange takes place within institutions and groups. Markets do not exist or operate apart from the rules and institutions that establish them and that structure how buying, selling and the very organization of production take place. Consequently, inherently, there are multiple market capitalisms. There is not a single market system that is distorted in various ways by institutions and politics in the several national contexts.[2] In a supposedly global economy international competition among members must be understood as an interplay of these several national market systems. National stories do not stand alone and cannot be examined in isolation.[3]

[1] The beginning of the shift could be seen 20 years ago. It is expressed in the difference in vantage from Rostow (1960) to Gerschenkron (1962). In political science the same shift is reflected in the move away from the modernization debate in which Weberian ideal types were sought in real societies and development was seen as a dichotomous move from traditional to modern. The turning point in the debate was undoubtedly Moore (1966)

[2] There is a great risk in the notion that 'strict economic theory should be taken back to fundamentals, or rather to the deeper level of *pre-institutional* economic analysis' (Pasinetti, 1992) The italics are Pasinetti's.

The converse view is developed in a broad range of work beginning in the 1970s. Some of the initial work includes: Peter Katzenstein (1978), my books (1977 and 1983) and Hall (1986). In particular Hall and I argue that not only is policy channeled by institutions, not only is political conflict structured by these arrangements, but the definition of interests and objectives is created in institutional contexts and is not separable from them.

[3] The notion of models and rivalries is expressed in Albert (1991) which has entered the French debate and Thurow (1992) which reflects the present American debate. Or one might point to the American preoccupation with Japan, as with Carrington and Edwards (1979) and Vogel (1979).

An examination of the character of that interplay among national systems underlies the logic of Zysman and Tyson (1983) and is developed there in several cases. It is also central to Borrus (1988). I develop this line of reasoning in the concluding chapter of *Political Strategies for Industrial Order* (1977).

The institutions, groups and rules that provide the context for markets have their origins in the creation of the nation-state and the initial steps toward industrialization. They have taken on their modern character as solutions to a broad range of social and political problems. For the most part these institutions, groups and rules do not have primarily economic origins and none have purely economic sources or explanations.[4] The institutional approach presented here is quite distinct from those traditional within economics and which have been exported to other social sciences. It argues that the focus should be on the historically rooted national institutions that frame the choices of individuals and structure the terms on which issues such as agency problems and contract problems are confronted. The approach proposed here is a necessary complement to an institutionalism more familiar in economics. The historical institutionalism frames problems and provides answers to puzzles that concern microeconomic based institutionalism.

2. *Institutional Foundations, Policy Routines and Market Logics*

Section 2 sketches an institutional approach to a political economy of diversity intended to derive the specific dynamics of the several national economies. Core to that approach is the historically rooted role of institutions and their influence on the economy.

The Dynamics of National Systems: Market Logics

Our initial task is to suggest a framework treating the links among politics, institutions and markets. I sketch here a four-step approach to link institutional and social contexts to the dynamics of national market systems.

Step 1. Each economy consists of an institutional structure. The institutional organization of politics and markets defines the choices of each actor. It induces nationally specific political and economic dynamics.

That institutional structure is a function of the country's distinct political and industrial development. The character and function of those institutions are often evident only in their history. Many critical institutions, social arrangements and social groups predate modern societies and market econ-

[4] Consequently institutions cannot be reduced to economic phenomena interpreted as the product of rational calculus of rent seeking individuals as George J. Stigler might argue. Nor can they be viewed exclusively or even centrally as instruments whose design is the result of efforts to achieve efficient actions and transactions. Microeconomics alone, whether in its rent seeking or efficiency manifestations, cannot drive our theories of institutions. A political theory of institutions must be part of an account of economic dynamics and the variation in national response that we observe. One must account systematically for the variation in market logic generated by varied institutions and rules.

omies; others are given a modern character, often by force, in a struggle over a variety of non-market issues. These institutions and arrangements, which often shape the form of modern markets, cannot be understood simply by a narrow analysis of economic calculus.

One implication is that an analytic understanding of the origins of a country's market institutions and rules is an essential part of the task of understanding how contemporary market systems operate. The progressive evolution of these structures defines evolving sets of constraints and incentives. 'Historisis', the economist's awkward way of saying that history matters, and punctuated equilibrium, a convention to suggest that economic systems progress between periods when institutions define routines and periods when institutions and rules are themselves redefined, both point to the notion of movement from one institutional structure to the next.

Step 2. That institutional structure of the economy, combined with its industrial structure in a more classic industrial organization sense, creates a distinct pattern of constraints and incentives. This defines the interests of the actors as well as shaping and channeling their behavior.[5] The interaction of the major players generates a particular 'policy logic' and a particular 'market logic'. Since the national institutional structures are different there are as a consequence many different kinds of market economies.

Each market economy is defined by the institutions and rules that permit it to function or, said differently, each national system can be defined by 'institutional structure' of the economy that structures how buying, selling and the very organization of production take place. The crucial elements of that institutional structure are the markets for capital (including markets for companies), markets for labor (including markets for managers) and the state as the maker of rules. The task is defining the patterns of incentives and constraint.[6]

Step 3. Market logic, specific to a particular national institutional structure, drives corporate choice shaping the particular character of strategy, product development and production processes in a national system. A specific market logic (and political logic) then induces distinct patterns of corporate strategy (and government policy) and therefore encourages internal features of companies (and the government) that are unique to that country. There are typical strategies, routine approaches to problems and shared-decision rules

[5] Alexis de Tocqueville makes the classic argument. See in particular *The Old Regime and the French Revolution*. Bendix's (1964) explication of the argument is helpful.

[6] Joseph Stiglitz's excellent work on finance is one example. A particularly lucid non-mathematical presentation is 'Financial Markets and Development' (1989). Soskice (1992) is a second example.

that create predictable patterns in the way governments and companies go about their business in a particular political economy. Those institutions, routines and logics represent specific capacities and weaknesses within each system.

Step 4. Trade competition must in part be understood as an interaction of these national market logics. Differences in corporate strategy and access to markets and technology create patterns of international trade competition.

A national institutional structure creates the foundation for nationally specific patterns of industrial adjustment and economic development. Each particular structure sets a definable pattern of incentive and constraint for the several actors within the system; the interaction of the actors creates a distinctive national market logic. Nationally specific patterns of government policy and corporate strategy, distinctive routines that characterize one country and not another, are the result. Particular patterns of interaction between national systems are also the result of the particular national systems.

To illustrate this logic let us suggest the outlines of two cases of the link between the institutional structure and the routine patterns of policy and corporate strategy and policy that result. Each step in the analysis can be presented using the many similar stories which have been built in the field of comparative political economy (Zysman, 1977; Katzenstein, 1985; Hall, 1986; Turner, 1991). The argument can be built somewhat 'bottom-up' from such archetypal instances of the 'embeddedness of corporate strategies and government policy in the institutional structure'.

Institutions, Policy Routines and Market Dynamics: Some Illustrative Examples

Policy routines and corporate organization in France.[7] The French case illuminates how the institutional structure acts to generate policy routines. French political–economic institutions produced constant policy responses to a diverse set of industrial problems in the period from the end of World War II until the mid-1980s (Zysman, 1977).[8]

The basic institutional frame of French policy has been evident from the late 1950s. The French executive has the capacity to formulate and pursue an interventionist strategy: the executive has considerable autonomy from selective legislative interference; the administrative system is centralized with considerable discretion in its implementation of the law; and the financial

[7] These arguments are drawn from Zysman (1977).
[8] The same position was adopted in Zysman (1986).

system is under the influence of the state.[9] Since market relations among these groups were defined by the credit-based financial system of government administered prices, each circle contained a series of instruments for government intervention and influence in industry. The limits on that government influence were defined by (i) the political buffers of trade associations, which acted as insulation from state authority; and (ii) the industrial structure, which consisted of noncompetitive, tradition-bound small firms that had been historically protected from foreign threats while competition was organized at home. Consequently the state preferred large projects with goals that could be defined centrally and large institutions with which it could deal directly.

The core French strategy for industry has also been evident. The French strategies in competitive industries concentrated on the means to control market signals and the creation of large domestic players to act in oligopolistic markets. The French solution worked when the tasks at hand required the mobilization of resources, when it was possible to define a limited number of technological results and when the competitive market could be suppressed, controlled or oriented by the state. Success is evidenced by Ariane, Airbus, the TGV and the Minitel system. But when France could neither dominate nor negotiate the markets it simply suppressed market signals and insulated its firms, hindering their adjustment. To limit dislocation the government encouraged growth by merger rather than by victory of the stronger, often leading to awkwardly structured and clumsy giants. Not surprisingly the strategy did not work when a company rapidly had to adapt its products and processes to changing international market conditions. As a result the French position in consumer electronics and now high-volume digital electronics has been weak; its position in electronic components untenable.

The policy pattern and market logic are clearly reflected in French trade statistics. Overall French trade reflects this pattern: it is strong in armaments and in heavy capital goods sectors (such as planes and trains), where government support is effective in developing products and selling goods; but consumer durable sectors and machine tool industries are weak, since there these strategies are often harmful.

This pattern of policy interestingly had a powerful influence on corporate structure. Firms which depended on the state—whether for markets, subsidies or rules—tended to mimic the structure of the state. They did so because the centralized state structure required senior corporate executives to

[9] Viewed from the vantage of a senior political executive, the French system could be understood as a series of circles of power and influence emanating out from a core defined by the prestigious *tresor* in the Ministry of Finance. The second circle would include the parapublic banking institutions and the third the commercial financial institutions.

connect to senior state officials. That mimicry was amplified by the system of Grandes Ecoles and Grands Corps that staffed senior levels of the state bureaucracy and of many private firms. The results were patterns of organization that were so typically French that they were attributed by many to French culture and styles of preferred authority relations (Crozier, 1964, 1973). Those authority relations in fact had historical origins in the creation of the French state; the spread of that pattern was forced imitation in some cases and learned styles of organization in others. However, in sectors where firms were not so protected by the state or insulated by protection from foreign rivals, the typical organization reflected the requirements of competition and was closer to international norms (Zysman, 1977).[10]

In sum, an historically rooted institutional structure generated a pattern of policy, a pattern of trade and a distinct organizational style in government and corporations. However, that pattern of French policy has been evolving since the 1980s. Its institutional structure is being reformed. The state's strategies and capabilities for industrial intervention are being redefined both by European integration and by domestic efforts to redefine the role of government.

Production revolution in Japan; corporate responses to institutional and market incentives.[11] The Japanese case makes even clearer the institutional roots of market logics. Japanese firms responded in a rational and understandable fashion to the policy and institutional incentives that were created historically. The pattern of incentives generated a particular market logic that produced a distinct pattern of government policy and corporate strategy. The government acted as a gatekeeper to develop the technology in an insulated market under Japanese control. Japanese policy produced intense internal competition, but the competition it created was managed and controlled. In this system of intense but managed competition, pursuit of market share was the best way to pursue profits (Tyson and Zysman, 1989). This had two important consequences: production innovation in the firm combined with a search for technology around the world and waves of excess capacity translated into aggressive export policies that often blurred into dumping abroad.

Let us examine this more carefully. The logic rests on three aspects of the Japanese political economy. First, the Japanese market was relatively closed

[10] In earlier work I have told the story of how French business mimicked the structures of the state. I sought to show more generally that dominant organizations control resources essential to subordinate organizations. A similar notion has recently been developed in the discussion of organization isomorphism. See for example DiMaggio and Powell (1991).

[11] Drawn from Tyson and Zysman (1989).

to the implantation of foreign firms. Consequently competition was restricted to Japanese firms. Second, there was a rapidly expanding domestic demand. Financial resources channeled to expanding sectors by government policy permitted firms to satisfy demand by building production capacity. Third, foreign technology was easily and readily borrowed. Under these conditions market logic encouraged Japanese firms aggressively to pursue market share as a means of maximizing profits—goals traditionally assumed to be contradictory. Formally, firms faced long-term declining cost curves (Murakami and Yamamura, 1982). They could jump quickly from one product/process generation to the next by borrowing technology abroad during the catch-up years of an expanding domestic market. That meant that as firms increased volumes—ideally capturing more market share in the expanding market—costs would fall, allowing prices to drop to increase sales, thus starting the cycle over. A firm borrowing product or process technology abroad could drive down its costs by steadily expanding production and also capture both scale and learning economies by building pricing and building capacity in anticipation of demand. Borrowing again it could start the process over. In my view the learning curve influences—not the scale economy as such—were the most important. They encouraged the Japanese firms to amplify their capacities to adjust, adapt, and 'bear the risks that are associated with innovation'.[12] Faced with long-term declining cost curves, firms developed the ability to move new technology to market quickly, price and build capacity in anticipation of market and implement rapidly what they learned as production expanded. These became basic characteristics of Japanese companies.

As all firms sought to maximize market share by heavy capacity investment, excess capacity and excessive competition resulted. This in turn led to efforts to regulate competition that included creating cartels or production controls negotiated among firms. Equally important, constant efforts to import and develop foreign technologies created a basis for a government organized technology consortia which likewise structured and bounded competition. None of these arrangements are stable but they have often served to bind or regulate the consequences of excess capacity.

The pursuit of market share spilled over into international markets (Yamamura, 1982). Companies in Japan competed for market share, which required them to build production capacity in anticipation of demand. Excess capacity was almost inevitably the result. Since much of the production capacity was then a fixed cost, the temptation was to sell at marginal production cost in foreign markets. As long as the domestic market was insulated and foreign

[12] Thanks to Nathan Rosenberg for this particular phrasing.

markets open for sale of excess capacity, Japanese firms had a constant incentive to build in anticipation of demand and off-load the consequences of over-ambitious judgments on to foreign markets. In fact, when the domestic market became saturated, a group of firms would begin to export at the same time. The result, in the phrase translated from the Japanese debate, was a 'down pouring of exports'. The sudden flood of exports into the major export market—the USA—caused intense political conflict with America in a series of sectors beginning with textiles and continuing through sectors such as televisions, automobiles and, later, semiconductors. The periodic battles over Japanese dumping are thus a function of the domestic pattern of competition in which market share is key.

The corporate practices fashioned in the era of rapid growth significantly affected the tactics of production organization in the factory. With large protected domestic markets and access to borrowed technology, Japanese firms were then encouraged to grow rapidly, to pursue market share and to exploit increasing returns. The key to organization became flexibility. Those Japanese firms that could organize themselves flexibly to capture the gains of introducing successive waves of borrowed technology had an advantage domestically. Competition among Japanese firms turned, in no small part, on manufacturing innovation and the introduction of new product. In fact, the particular strategies for production that emerged in Japan created distinct and enduring advantages in global markets. The Japanese case leads to the issue of how one nation's policy routines and market logics influences the options of another.

Competing Capitalisms: The Interplay of Market Logics

National 'market logics', national systems of institutions and policy routines do not exist in isolation. Rather they coexist, interconnect and interact in the international economy. But how do we understand those connections? The notion of competing capitalisms implies at once rivalry between economic systems, conflicts between governments, and competition between companies from different countries advantaged or handicapped by the market logic of their home bases.

Different images suggest quite different metaphors of competition and indicate alternate lines of analysis. To begin we might imagine a horse race run on a straight track. The several economies seek to travel the same course faster to the end line of common rewards of income and welfare. The order of finish does not establish special rewards. The victory of one does not disadvantage the others. In this image differences in national savings and

investment rates, the efficiency and effectiveness of financial systems (which are definitely not the same thing) or the capacity for innovation in production and product development will all influence which country runs first. The speed at which mass production or multidivisional organizations are adopted will influence who surges forward, but it does not dictate how far behind the others are. Rather the domestic capacities and will to achieve efficiencies and adaptations are key to the final order of finish. In this first image, then, government subsidies or protections act to reduce the welfare of all.

But let us change the metaphor of competition, change the character of the rivalry. We do not need to adopt a mercantilist image in which a fixed quantity of gold or a fixed number of jobs are to be divided between countries. Let us assume that the actions of one player substantially constrain the ability of rivals to reach their objectives. Suppose there may be multiple roads (technology trajectories for example) to goals of employment and growth. However only one runner is allowed on each trajectory. If country A bumps country B on to a muddier (slower) tract or a longer route, then the consequences may be more enduring. Suddenly we enter a world of strategic trade, a world in which early developers affect the patterns of later developers (Gershenkron, 1962; Krugman, 1986; Tyson, 1992). In this world my subsidy allows me in an oligopolistic industry such as aircraft to capture market share, rents, or high value added jobs which I may be able to maintain in the longer run. Your entry into my market may preclude my firm from ever entering a new sector (Buigues and Jacquemin, 1993). If you block my entry into your market it can affect the very logic of competition between firms in our two countries—substantially disadvantaging my companies in the long term (Borrus *et al.*, 1983; Borrus, 1988). Without market access I may not be able to achieve economies of scale, the risks of large scale investment may rise, the equipment and production base on which next generation product rests may erode.

The crucial step in this second and nastier game is the move from the logic of strategic trade in a single sector to the logic of competing trajectories of national development. That is, acting strategically, a government may be able to influence the outcome in a competition in an oligopolistic industry such as aircraft or a dynamic industry such as semiconductors. Of course success in influencing the outcome of a particular competition does not necessarily imply that the government gains growth advantages for its economy. For example the cost of the support may exceed the rents captured in which case the aggressive government may actually reduce the national welfare. The claims, for example, that the European subsidies to Airbus are welfare reducing imply just this. Nor does failure to defend an industry

necessarily result in a drop in welfare, growth or high-wage employment. The resources used in the targeted sector may be redeployed to other equally valuable uses, as standard models would suggest. In any case, in this second metaphor, a government can intervene and deeply affect who wins and loses in the marketplace; it can influence—either positively or negatively—the balance of gain between its national firms and others.

In all this a crucial analytic problem remains that jumps from the particular to the general. That is, the government's ability to influence outcomes in specific markets to its national advantage does not inevitably create longer term growth advantages and conversely its failure to generate advantage does not automatically produce disadvantage. The link between the particular market stories and the longer term path of growth turns on how one conceives the economy to be organized and the dynamics of its development. If activities are tightly linked together, the loss of one sector can erode the position of others. That linkage may come in the form of service jobs tightly bound up with manufacturing jobs so that if the manufacturing jobs vanish the services for manufacturing will disappear as well (Cohen and Zysman, 1987). The linkage may come in the form of a supply base of components, subsystems production equipment and product and production know-how that define possibilities and constraints on a line of technological development or the possibilities of diffusing transformative technologies. In other words, linkages may define lines of technological and development trajectories.

If the stakes in particular industrial competitions are broad lines of economic development, then trade competition takes on a nastier feel. The temptation to use policy instruments to advantage national firms is powerful particularly if one fears that rivals will act first to capture the better trajectory. The result can be the recycling of the cult of the offensive from the realm of military strategy to the domain of first mover advantages in strategic trade competition (Weber and Zysman, 1992; Zysman, 1992).

This optic of a distinctive market logic can then be used to predict behavior or to illuminate a single case. In the previous section we depicted a distinctive Japanese pattern of development that led to 'excessive competition' internally and a down-pouring of exports and dumping externally.[13] Consider the semiconductor story in which over the last decade the Japanese industry seized leadership from US producers in the leading-edge commodity memory products (DRAMS—Dynamic Random Access Memories) which honed production skills (Borrus *et al.*, 1983; Borrus, 1988). Three features of the Japanese system were crucial in producing the particular logic of com-

[13] A variety of cases will illustrate this. A number are developed in Zysman and Tyson (1983), see in particular the semiconductor, steel and consumer electronics cases.

petition in Japan: first the incentives and financial capacity to pursue market share strategies as described above; second the industry organization in which component producers were also major producers of final consumer products such as televisions; and third the capacity to limit market access by foreign firms. Market share strategies tended, as described above, to lead to excess capacity and dumping. The Japanese firms were in this period producing for price sensitive consumer markets in which marginal performance advantages were not central. By contrast, competition in the USA was structured around merchant component producers who were not competitors in final product. Indeed two of the strongest integrated producers, IBM and AT&T, effectively were precluded by anti-trust decisions from entering the merchant market and each had sufficient internal demand arguably to capture available economies of scale in development and production. Basic market demand was driven by military and computer requirements in which marginal performance requirements were important and demand was less sensitive to price. Thus competition was between two differently structured sets of firms in two markets with different requirements.

The entry of Japanese firms into the US market came at the moment at which a surge of IBM purchases in the merchant market created a temporary shortage in the USA. The trade statistics show clearly that Japanese firms met that demand but also satisfied their own internal needs with imports of American product. When the temporary shortage ended, the Japanese were entrenched in the American market, and as they expanded capacity they then displaced their American competitors from the Japanese market. In the years that followed the Japanese approached each new generation of product by announcing massive capacity. Usually sufficient capacity was announced that excess supply in the Japanese market and the low price exports that such excess capacity created were virtually inevitable. Later the Japanese firms tended to define capacity against the demand in the world market, which simply aggravated the problem. In part the American firms tended to withdraw from the market when confronted with probable excess capacity and surges of low priced imports. The Japanese firms were in part willing to bear the financial penalties because they were final product producers in consumer electronics who saw component expertise as a means of advantaging themselves in final product competition. Certainly the Japanese producers did establish new standards of production quality which made them formidable players in commodity products. However, the causal links are not obvious. Protection that excluded foreign competitors that had product and process advantages created an odd stability and intense domestic competition. In the automobile sector a strong case can be made that such arrangements facilitated the production revolution. The basic pattern of

competition, resulting in substantial measure from managed access to the Japanese market, induced production innovation strategies.

In any case the logic of international competition reflected the market dynamic in each country. The American market was centered around smaller merchant producers competing principally in markets in which performance was critical. The Japanese market was organized around larger integrated firms competing initially in price sensitive consumer markets. Over time the US firms withdrew from commodity markets into design and value intensive market segments. This strategy however was vulnerable to a potential Japanese domination of the underlying production know-how and production equipment as well as the difficulty of capturing enduring market position in the Japanese market. In sum, US policy responded to the mismatches of market logic with domestic policy in the form of Sematech to bolster production know-how and trade policy to limit predatory strategies and open the Japanese market. The economic importance and strategic significance of the semiconductor focused attention.

The story of the semiconductor industry competition, and more broadly the analysis of the Japanese case, has suggested how a particular national market logic can disturb the international trading system. But not all market logics are disturbing to the international system, and the interplay of market logics can also be advantageous to both sides. Denmark is an interesting case. It has few raw materials, a vulnerable strategic position and is in all sorts of traditional, supposedly slow-growing industries. Yet, whatever its problems, Denmark remains a very rich country with very high incomes as a result of strategies of creating value in market niches. The Danish strategy is one of importing commodity low-value inputs and in the case of grain feeding them to pigs and cows to create a dairy farming and food processing industry and in the case of semiconductors putting them into hearing aids and exceptionally expensive consumer electronics.

The line of argument so far is that there are national institutional foundations of market systems that generate quite particular logics and dynamics in each case. Those national stories, moreover, cannot be understood in isolation but rather must be seen as part of a competition and interaction. Some bold and crucial implications suggest themselves. While they are not developed fully here, it is worth suggesting the analytic and research logic this argument suggests. Crucial implications would be: (i) that different 'market' logics have long-term effects on the patterns and rates of growth of each economy; (ii) that the character of the interplay of national market logics between a country and its principal trading partners can influence the character of growth of each; and (iii) that the market logic of the dominant national economies can influence the world economy as a whole. We return

at least briefly to the first of these questions when we consider arguments about 'national' systems of innovation.

Which Institutional Capacities Matter? The Critical Institutional Foundations of a Market System

Next we ask how we proceed to specify the institutional arrangements of an economy; or put differently, specify the system parameters. There are difficulties. We build up an institutional model of a national political economy, explicitly or implicitly, in two ways. A first approach specifies a set of institutions, then hypothesizes the outcomes that can be explained by different arrangements or structures. The approach here is to define the institutions which set administrative/political relations, labor markets and financial markets. One major problem is that a seemingly endless range of institutions matter to the dynamics of a national market. Another major problem is that the institutions do not stand alone. It is not the character of a financial system, for example, but its relation to the state bureaucracy and political system that matters. Labor relations systems that embed powerful centralized national labor movements (Sweden) and systems that are part of a weak national labor movement (Japan) have supported rapid growth and productivity improvement. Clearly one cannot observe a single institutionalized market—finance or labor—and conclude that similar arrangements will have the same consequences in a different national system.

A second complementary approach would specify classes of outcomes. Then the task would be to reason out the arrangements of institutions that would produce those outcomes. Examples of classes of outcomes discussed so far are the patterns of French policy, trade relations and corporate organization and the character of Japanese production innovation.

Our central concern in this paper is a particular class of outcomes, trajectories of growth. Section 3 of this paper considers how institutions generate a national growth trajectory by shaping patterns of innovation and technological development. That answer, as we shall see, derives from and is an application of an account provided by political scientists of the routines of policy and the political settlements that establish the terms of economic development. After World War II the advanced countries found diverse solutions to the common challenges of sustained growth. As different as they were these diverse solutions all provided solutions to the technical tasks of generating growth, allocating resources to sectors and organizing and reorganizing production/distribution, while providing a workable solution to the political problem. Note also that the political problem is much more than just preserving social stability. Political stability that suppresses eco-

nomic change, the Tokugawa era in Japan for example, simply dampens growth. Economic development is an inherently messy and painful process. Worker or management skills are devalued resulting in lost jobs and incomes. New skills or technologies are rewarded. The political problem is resolving the question of who gains and loses from growth. Endless struggles over the gains and pains of growth can interfere with growth by disrupting the very processes of market adjustment. Industrial strikes, farmer protests, lobbying for rules to preserve market position or to facilitate new industries are all simply expressions of the politics of adjustment, efforts to seek a settlement of who wins and loses from growth. Losers, we might note, can be dealt with by ignoring them, compensating them or repressing them. The particular choice becomes part of the settlement allocating the costs of industrial change and the mechanism of allocating those costs. Those diverse solutions suggested three distinct models of industrial development and adjustment. Each model embodied:

(i) technical capacities for state action in industry;
(ii) a political settlement allocating the costs of industrial change; and
(iii) a political process by which that settlement was reached.

The precise vocabulary and features emphasized varied but the list of models always included:

(i) **State-led adjustment** with developmental objectives in which a distribution of costs and gains is imposed by political manipulation of the market.
(ii) **Negotiated adjustment** with a corporatist tone in which there were explicit bargains among elites representing segments of society.
(iii) **Company-led growth** with the government acting principally as a regulator and umpire, with the political settlement simply left to the market, and with the government providing some small compensation to those who complain the loudest.

In other words, these models of industrial adjustment were distinguished from each other by the way their politics and markets were organized (Zysman, 1983).[14] The distinctions, as we shall see, influence the character of growth.

A core list of institutions central to a broad range of economic development problems in the advanced countries then suggest themselves:

[14] The three models represented different solutions to the same central problem: how to reallocate resources among different economic sectors.

(i) the character of the state: that is, the government's institutional capacity to shape adjustment by setting rules and allocating resources selectively toward purposes it defines (this might include generating learning and innovation);
(ii) the character of the labor relations systems, particularly in this period the flexibility of the shopfloor;
(iii) the organization of the financial system as it influences corporate governance and state influence in industry; as well as
(iv) the legal/regulatory system that defines the rules of control within markets, the organization of firms, and the possibility of negotiations among the major producer groups.

A fuller discussion of this historical institutional approach would require that we consider here how the first three of the crucial institutional features of state, finance and labor influence these three models of adjustment. Here, we set aside that problem in the pursuit of our central concern with the application of the approach to the question of growth. However, some comments on the nature of this approach are important at this point.

The Origins and Evolution of Institutional Structures

Asking the fundamental question of what drives institutional development divides analysts quite fundamentally. The institutional structure of market economies sets down patterns of constraint and incentive. It thereby induces routine behaviors from companies and government. Consequently, variations in those structures contribute to distinct development trajectories. Evolution in those institutional structures will provoke evolution in economic routines. An institutionally based account of diversity in advanced industrial countries therefore needs some approach to the question of origins and evolution of institutions.

What account, therefore, of the origins and evolution of institutions is required for a systematic political economy of diversity? The basic outline of a society's institutional structure is built as part of its course of industrial and political development. The particular course of development creates a distinctive institutional structure for governing the markets of labor, land, capital and goods. The centralization of the French system was established as part of the state system and as an extension of the authority of the king. In Germany the catch-up required for late industrialization, the capital requirements of heavy industry and the security necessity of accomplishing something different very quickly encouraged bank-centered development as a means to collect savings and start enterprises (Gershenkron, 1962). The

shopfloor fragmentation of the British labor movement reflects its origins in craft unions; the legal framework of union rights that declare them not to be a criminal or civil conspiracy made reform around responsibilities extremely difficult. Because these arrangements—state structure, financial market organization and labor market rules—touch the interests of so many and are rooted so firmly in the development of economic, legal and political systems, they are very difficult to alter. We speak of institutions—not just organizations—because institutions do not radically change with each shift in the balance of political power. Rather existing institutions are used for new purposes by new groups. New economic problems are dealt with, at least initially, through existing routines.

But institutions do evolve and two mechanisms of development must be mentioned. The first mechanism is the sheer force of dramatic crisis—revolutions, depressions and wars—that disrupts political and economic life and reopens established agreement and arrangement. The continuity even after dramatic crisis is often remarkable. In any case we can say little systematic about such crises. The second mechanism, mismatches between capacities and tasks, is more amenable to analysis. The institutional arrangements of markets and the routines and logics thus generated represent distinct capacities to address particular sets of tasks. As long as capacities match the tasks at hand, all is well. Unfortunately tasks evolve and capacities degrade—creating a need for continuous political and technical adaptation.

Expanding or altering institutional capacities to respond to new tasks requires institutional adaptation. The difficulty is that while policy and corporate patterns are not immutable, they are deeply entrenched. The political process of creating a new match between tasks and capacities takes us far beyond our concerns here, but let us simply say that the solution must at once solve the technical economic problem and the political problem of allocating the gains and pains of growth in a stable way among the winners who profit from the process and the losers who are disadvantaged. Unless a country is able to allocate these gains and pains effectively it will sink into a morass of conflicts, powerless to adopt cohesive development strategies or even to focus on immediate technical tasks.

The approach to how these political changes take place will differentiate analysts. Rational choice theorists would focus on the gains from a particular change in institutional arrangements to identify the groups that will support a program of adaptation and those that would oppose it (North, 1990). In many ways the underlying notion of rational choice and institutional economists is similar to Marxists. Both define groups by their economic interests, ask what the crucial economic relations are and how groups stand to gain advantage. Rational choice theorists such as Rogowski and neo-Marxists such

as Peter Gourevitch write stories whose core narrative is very similar. Others, such as Leubbert and Ruth and David Collier emphasize that groups are not economically predefined but politically created. Their interests are open to several definitions and in fact are created by the coalitions they join. The political process in this latter case is not a rational calculation but a political struggle. Advantage and position are defined in political, not simply economic, terms.

In sum, solutions to new problems must always involve a new match between tasks and capacities. That rematch involves reform of institutions but institutions evolve slowly, radically altered only by political conflicts and the settlements that follow. The most fundamental of these institutions and institutional arrangements cannot be reduced to economic issues of either efficiency or greed. Rather they are rooted in more general processes of political development and dynamic.

3. *The National Institutional Roots of Growth Trajectories and Technological Development*

National institutional structures, themselves creations of the historical processes of industrialization and political modernization, are central to any account of diversity in economies. This section presents an institutional interpretation of historically rooted national growth and technology trajectories. We relate this institutional analysis directly to the evolutionary economics arguments about technology trajectory, but the same logic could be applied to other arguments about growth that highlight the processes of information diffusion and the generation of new ideas. These arguments have distinct intellectual starting points. But they have in common the notion that it is not just an accumulation of capital investments that drives growth. Rather growth is a function of the accumulation of technological bets that create new uses for and means of employing capital. Those bets, as we shall see, can only be understood in a national institutional environment.

National Trajectories and the Social Plasticity of Technology

In the 1950s and 1960s analysts sought to understand how technology set molds for society and consequently how technology, evolving according to its own interior logic, would remold society. By the 1980s the weight of the study of technology shifted away from the analysis of universal constraints toward the analysis of particular national technological trajectories and

models of innovation.[15] Importantly, technology began to be treated as a product of the national economy, as an endogenous process. This made plausible the notion of national competitiveness as a set of national technological capacities (Amendola *et al.*, 1993; Dosi *et al.*, 1993).

Technology, like market processes, is not disembodied. It develops in communities; it has local roots. The processes of learning that drive its development are shaped by the community and institutional structure, and consequently the technological trajectories can only be defined in reference to particular societies. Consider first that technological knowledge and know-how is transmitted through at least three mechanisms: individuals, organizations and communities. The tacit knowledge that constitutes know-how rather than readily available blueprints resides in combinations of individuals, that is in organizations and communities. Consequently the character of these organizations and communities gives particular form to the process of technological development and innovation. Second, the specific composition of industry establishes at any moment the set of scientific and technological foci of a community in the form of university programs, the training of engineers and scientists and the skills of the workforce (Stiglitz, 1989; Nelson, 1993). Third, a particular supply base—the set of components, subsystems, production equipment and know-how resident in an economy or market—delimits the possibilities for firms and the directions of technological development. Fourth, the optic through which a problem is defined and a solution perceived varies with community. Thus strategies and tactics for approaching technological problems will vary from place to place. The distribution of technological bets, the direction of effort, is set by the nature of the community as well as by the composition of public and private demand.

Of course over time the bets accumulate. Heavy investment in one technological route makes it less likely that alternate, even theoretically more attractive possibilities, will be adopted. This has often been the case as industries develop. Firms forego abstractly attractive technological possibilities because they push the frontier of more limited and mature approaches. Consider the automobile industries' effort to build light engines. Iron engines were reduced in weight more rapidly than aluminum engines could be given strength (Abernathy, 1978). Similarly trajectories that emerge in one country cannot be copied easily. Switching from one trajectory that evolves in the USA, for example, to a trajectory that emerged in another country can be extremely difficult and, if possible, very expensive. In sum, technology is a socially created constraint.

[15] There is a great variety of work on these subjects. I have been particularly influenced by Giovanni Dosi, Richard Nelson and Chris Freeman. See for example Dosi *et al.* (1988). The recent work edited by Lundvall (1992) is also relevant here.

Over the past decade this view that countries are following different technological routes, and consequently distinct patterns of growth, has gained adherents. First, countries develop technological specialty. Patterns of patents are distinct for the several advanced countries (Patel and Pavitt, 1992). Indeed there is evidence that difference in the degree of technological specialization has actually increased (Archibugi and Michie, 1993).[16] Second, the national patterns of trade, the outcomes of technological specialty, are quite different. Countries clearly succeed in technologically quite different products (Dosi *et al.*, 1990; Guerrieri, 1991; Guerrieri and Milana, 1991). Third, at a fine grain, an evaluation of particular industrial sectors shows technological specialization within particular sectors (Patel and Pavitt, 1992).[17]

Moreover distinct national technological communities appear to continue in the face of 'globalization' of markets. The market for technology has become global; high-tech exports have grown as a percentage of world manufacturing, but the sources of technology traded remain national (Guerrieri, 1991).[18] Secondly, global technological collaboration has expanded in recent years, but there does appear to be complementary exchange between separated national technology communities and the firms rooted in these distinct national communities. This is the bumblebee or butterfly theory; the multinational corporation as an agent of cross-fertilization.[19]

[16] The excellent article is very close to our own view of the matter; Callan (1993). That, as an aside, raises the problem of the risk of overspecialization in a competitive environment that can lead countries and regions to sudden dislocating bumps from the international market

[17] Individual cases also support this analysis. German and Japanese machine tools are quite different. the one reflecting German specialization in small batch capital equipment and the other the Japanese innovations in flow assembly of complex consumer durables. US and Japanese expertise in the electronics industry is along different roads; the US has a dominant position in the architecture and design of new systems and Japan in the manufacture and assembly of components and products.

[18] Seen from this vantage of a supply base that underpins final production, it is not surprising that Guerrieri finds that export competitiveness in production equipment is linked to the competitive position of firms in the final goods sector for which the equipment is used. Success in final goods and production equipment that support them are intertwined Production equipment is an element of the supply base that is created by and makes possible competitive advantage in the final goods. See also Patel and Pavitt (1993) and Bell and Pavitt (1993).

[19] A review of patenting data supports this argument. Archibuigi and Michie (1993) note that:

> the share of patenting controlled by foreign firms is 10% or less . . (except in Belgium, the United Kingdom and Canada). The share of foreign controlled patenting is very low for the two largest OECD countries, the US and Japan, amounting to 3.1 and 1.2% respectively

If the matter is rephrased to include only patenting by large firms, the MNCs who would play the bumblebee role, then the matter shifts considerably. Firms from countries such as The Netherlands do most of their patenting outside the home country (82%) while the Swiss and British firms 28% and 17% respectively. By contrast, German, French and Italian large firms do little R&D in host countries, while US and Japanese firms orchestrate their activities from the core.

The preliminary results of Callan's work on biotechnology indicate the same thing:

> . . . despite international sourcing of technologies, the biotechnology industries are promoted and used quite differently from country to country. They vary in terms of what type of biotechnology

From Technological Trajectories to National Systems of Innovation: Achievements, Limitations and New Issues

Our task though is to illuminate the importance of historically rooted national institutions to paths of growth. That is, we must consider the links between stories about micro/sectoral trajectories and patterns of national specialization for the overall growth paths that nations follow. We do so by examining the notions of national trajectories of growth that have emerged from evolutionary economics.[20] The story emerged in several jumps with analysis following the initial insight. Orthodox conceptions of economic growth, rooted in equilibrium models of economic processes, treat technological development as an exogenous process. Innovation being inherently uncertain infinitely complicates traditional theories which are based on rational decision making by actors who know all the possible options and all payoffs to their decisions. The market is no longer the perfectly functioning device tending toward equilibrium. Rather it is characterized by endemic failures, as Stiglitz argues, and is intrinsically out of kilter (Stiglitz, 1991). Those market failures seem to create distinct paths along which innovative adventurers advance. As Nelson and Winter (1982) argue, firms have regular and predictable behavior patterns called routines. Those routines are essentially decision rules that constitute a core make-up of the firm. Second, firms following these routines search for responses to their market problems. Third, selection environments in essence pick among alternate decision rules or genetic make-ups of firms.

The paths that firms follow broaden out into industry trajectories because technological linkages characterize sectors, as Nelson (1985) argues. The implications of the connectedness is that experience and being plugged into a wide range of technologies counts in innovation. The notion of a direction to these evolutionary paths, trajectories, thus emerged. The analysis jumped from corporate 'search paths' to technological 'trajectories'.

The next jump to a notion of national technological trajectories came years

they support, what institutions do research, how much funding they dedicate and where their national strengths lie.

For example, the structure of the industry, the types and numbers of firms involved in biotechnology, are quite different. In the U.S. pharmaceutical firms win the majority of biotechnology patents, whereas in Germany chemical firms dominate patents. In Japan, biotechnology innovation is almost equally split between pharmaceutical, chemical and food companies. Countries also differ in the terms of the types of biotechnology research in which their companies specialize [with an American bias for bio-pharmaceuticals and Japanese and German focus on wider possibilities using biotechniques in fine chemicals and food]. (Callan 1993, p. 13.)

[20] The original ground-breaking work of Nelson and Winter (1982) sought to demonstrate the limits of 'orthodox economics' in dealing with questions of growth and Schumpeterian competition. The book and the working papers that preceded it had a powerful and broad influence, in my case influencing my conception of the character of French technology processes and shaping my early work.

later. Innovation began to be interpreted as an activity that follows particular routes in a national environment where connections between different parts of the economy are strong.[21] As noted above, the processes of technological development are inherently local. Firms' routines would have commonalities, and linkages would be dense within each country. Moreover national institutions shape the 'processes by which firms master and get into practice product designs and manufacturing processes that are new to them' (Nelson, 1992). These distinct national systems then drive a development path of technology that moves forward with cumulative improvements. The theory has jumped from firm routines to industry trajectories to national systems of innovation.

But the notion of national systems of innovation is a loose one that is not well specified. The efforts to date to do so have not worked well. One approach to specification is quite narrow. The narrow definition, which underpins Richard Nelson's national system of innovation studies, only focuses on the institutions that we directly associate with aspects of science and technology. Those science and technology institutions affect the environment within which the firm operates and selects broad strategies and within which it makes decisions about product and process innovation. The difficulty is that the basic decisions about corporate strategy (which markets to attack with which product made in which ways) set the company's lines of technology development. In the aggregate these company lines of development create national patterns of innovation. Consequently national systems of innovations (NSIs), defined narrowly as the elements of science and technology influence, but may not be the most powerful force affecting basic corporate strategies. Therefore narrowly defined national systems of innovation cannot—inherently—link to national patterns of innovation.

Lundvall (1992) adopts a broader approach, arguing that a 'National System of Innovation includes all parts of a national economic organization'. Lundvall's breakthrough is that technology and innovation is the outcome of his national story. The national system itself is defined more broadly than its technology elements. Lundvall correctly argues that innovation is driven by the logic of the situation in which firms find themselves, situations which are defined by the broader notion of innovation system he suggests. His position is close to the argument developed earlier here about the market logic of different national systems. However, his broad definition includes too much and the critical relationships are not defined.

[21] Much of the wording in this paragraph is from a research note commissioned for this project and prepared by Ulrike W. Hodges and Benedicte Callan (1993). I am indebted to them for the clear and crisp presentation of this body or work. Each of them is pursuing work related to these issues: Callan (1993) and Hodges (1993).

National systems of innovation are parts of the argument developed here. Indeed the two lines of argument grew in parallel to each other. This essay merges these concerns. The fundamental difficulty is that neither notion of national system, neither Nelson's nor Lundvall's, specifies how the 'system' drives innovation trajectories let alone fundamental outcomes in an economy. That requires a specification of the aspects of a 'national system' that are thought to drive classes of outcomes, as we argued above.[22] The arguments about NSI, as Soskice argues, evolved in isolation from the approaches to national systems developed by political scientists, industrial sociologists and political economists. Soskice (1993) writes:

> . . . much of the NSI (national systems of innovation) literature gives the impression as its name conveys that the key institutions explaining innovation are institutions which have to do with innovation activities. This reflects its development in something of a vacuum from the type of approach which in one form or another has been followed by many political scientists, industrial sociologists, and political economists from the 1970s on. This has been to see the institutional structures of advanced economies in terms of national models.

In sum, national systems identify a concern, but they do not provide an approach.

Institutions, Technological Development and National Trajectories

Let us begin the story again. We have to specify the argument so that notions of national institutional systems can be inserted. We proceed in three steps. First we examine how 'search paths' are created by innovative dynamics of the firm and the industry. Second we examine linkages in the economy to consider how 'technological trajectories are generated and sustained by the supply base on which a firm rests and the block of users that drive demand' (Dahmen, 1988; Borrus, 1993). Only then, third, do we explore how an economy's institutional structures (Zysman, 1977, 1983), the National Framework of Incentives and Constraints (Soskice, 1993) and the market logic that channel technological development and actually give form to the trajectories. Note that the emphasis here is on the 'direction' rather than the 'pace' of technological development.

[22] Mechanisms, lines of explanation, are scattered through the national systems 'macro or national story' literature. They include arguments about firm competences (R Henderson), relations to supplier and customers, institutions such as universities and finance (Dosi), and paradigms within which problems are viewed (Freeman). However, none of these arguments systematically present the features that tie elements of the national system to particular behaviors.

Proposition 1. The firm is the agent of innovation. Its strategies, investment, organizational decisions and technology choices are the source of innovation. Innovation involves a fundamental element of uncertainty: a lack of relevant information, techno-economic problems whose solutions are unknown and uncertain consequences of action. With such endemic uncertainty we cannot imagine rational actors maximizing much of anything but rather a set of firms searching for something that works. The firm searches are generated by the routines that emerge from these broad approaches.

Technology accumulates along particular lines at least between moments of discontinuity. A successful investment is made and then followed up. The sequence of investments creates a line of technology development. At those moments of discontinuity, established routines fail. A failed approach discontinues investments and in essence lines of investment and technological development are discontinued. Generally put, firms cumulate knowledge by learning processes, both generating and using the technology. The result of cumulating know-how and investment are lock-ins to lines of development, to trajectories. The lock-ins though are not simply matters of learning and intellect. Rather the cumulation of technological bets underpins these trajectories. Constraints on and inducements to those bets channel the development of technology (Dosi *et al.*, 1993).

A first conclusion is that distinct trajectories located in particular places are the logical result of the processes of technological development. A crucial initial pivot of the argument is that the processes creating technological trajectories are work independent of any set of institutions. Our next concerns become not simply what creates trajectories but what reinforces them and shapes them, giving them particular character.

Proposition 2. Technological and market linkages among firms and industries channel and reinforce these trajectories. They influence both what firms are likely to attempt (the distribution of bets) and which projects are likely to succeed (the probability of success). Together the distribution of bets and their probability of success establish the character of technological accumulation.

Two elements of these linkages concern us here, demand drivers and the supply base. Each element not only shapes technological dynamics and therefore influences the pattern of international trade but is in fact directly affected by the outcomes of trade competition.

Demand drivers are the sources of market demand that induce companies to innovate. They set targets and provide rewards (Lundvall, 1992, as well as others, has made this point). A highly sophisticated market will induce

producers to respond innovatively. An immature market is a handicap for local producers. Importantly, the sophisticated market may be the buyers/users of a high technology final product such as a large-scale image processing system or a supercomputer. Or the sophisticated market may consist of the producers of such consumer durables. The final product will be sold to relatively inexpert customers with limited technical expertise. The producers—Toyota, GM, Mercedes, Fiat—are the buyers of the technically sophisticated subsystems and components (Borrus, 1993).[23]

A supply base, the second of our linkage relationships, has been defined by Borrus (1993) as:

> The parts, components, subsystems, materials and equipment technologies available for new products and process development, as well as the structure of relations among the firms that supply and use these elements. The supply base shapes the possibilities confronting users by enabling or deterring access to appropriate technologies in a timely fashion at a reasonable price.

Logically supply bases act as a structural constraint on individual company choices. In this sense a supply base regulates firm choices in the same manner as the structure of an industry, as a set of constraints or opportunities. The supply base can be understood as an element of industrial structure or organization external to the firm that defines the choices of the firm. The supply base describes the technologies—the parts, components, subsystems, materials and equipment technologies—necessary for product development and production in a range of activities and describes their interconnections. A supply base consists of a set of interrelated activities; when they are tightly linked (i.e. mutually dependent and reinforcing) they constitute a development bloc (Dahmen, 1988, develops a similar notion). The notion of a supply base has intuitive appeal and its strength is that it allows us to see how distinct sets of technologies develop in a region or a nation and how access to those technologies shapes continuing paths of development. Stiglitz provides a general foundation for the results Borrus obtains. Stiglitz (1993) argues that there are critical 'diffuse externalities', externalities which arise for

[23] Borrus argues that a crucial question is whether in a world of global markets it matters for innovation in which country sophisticated demand is located. Innovative products require the closest ties between users and suppliers for the complex information to induce and use innovation to flow. That is generally easier in a single community. The character of supplier linkages and the terms of dealings, what are called market regimes, become essential in defining which communities will benefit most from the sophisticated demand at home. More generally, access to markets and participation in national and local production groups becomes essential. Where markets are open and local producers willing to involve outsiders in development, as when Fiat involves Motorola in its next generation auto electronics efforts, then the location of final demand matters less. Where access is more closed, as in the Japanese automobile industry, leading chemical and plastics firms find it very difficult to participate in the emerging Japanese demand for automobile plastics.

instance from the availability of a wide range of suppliers to a firm.[24] In sum, market and technological linkages induce and reinforce technological trajectories. But like the original argument about firm and industry dynamics, one cannot reason out the particulars of a specific country's trajectories. We know we should have trajectories but their character in particular places is seemingly still random. We come to the nub of our story.

Proposition 3. Institutional structures shape as well channel innovative processes to create specific technological trajectories. They begin to give form and specific content to a trajectory. As argued above in section 2, particular national institutional structures of the economy induce through enduring arrangements of costs and rewards particular patterns of routine behaviors by the different actors in the economy. The interaction of those actors then generates in each national market a distinct market logic. In the vocabulary of Dosi those routines and market logics create a focus in the distribution of technological bets and the probabilities that gives form to a particular trajectory. We can use a different vocabulary and intellectual frame, that of Stiglitz, to reach the same conclusion. Externalities are pervasive in the economy, and particularly pervasive in the innovation process, he argues (Stiglitz *et al.*, 1987; Stiglitz, 1993). The result of pervasive externalities in a dynamic economy is multiple equilibria. The particular national institutional arrangements push toward different resolutions, different equilibria.[25] The crucial implication for this discussion is that institutions are not neutral and can provide an explanation of the specific trajectories or equilibria that emerge.

[24] Linkages, as importantly, are maintained not only by tight market ties built on relationships or by formal restriction on market access by outsiders. Rather the linkages consist of and are created by 'the localized nature of information', as Stiglitz argues Product information, details of production processes and the subtle advances in each are easier to transfer within local communities than between communities This leads to, and is even clearer in, the case of the 'supply base'. Stiglitz (1993, p. 22) argues the case as follows:

> These kind of externalities are particularly important in the innovation process. As firms develop a new product, they have to draw upon resources (skills) of others. They have to know what is available; they require information about reliability, and about hard to specific quality characteristics . . . This kind of firm and product specific information is often hard to glean . . . Success may be enhanced by closer monitoring and more generally by closer interactions between the firm and its supplier. Both are facilitated by physical proximity. . .
>
> In effect what we are arguing is that specialization and competition—having many producers . . . —is particularly important in the innovative process. And what limits the size of the relevant market is not physical transportation costs, but information. . .
>
> Information is affected by proximity; it is easier to find out about plastic manufacturers in one's own community than in a country thousands of miles away. The reason for this is the localized nature of information. One is more likely to know someone who knows someone . . . in one's own community than in a remote country. If the local industry is of sufficient size that it is organized, the channels of communication may even be effectively institutionalized.

[25] Geoffrey Garrett and Barry Weingast have shown a similar result in explaining different lines of policy development (Garrett and Weingast, 1991).

The task is to link particular institutional structures to paths of technological development. We have already argued above how a particular political-institutional set-up induces a specific market logic and drives a trajectory of growth. For example, production innovation in Japan resulted from a distinctive market logic that in turn was a function of that country's political–institutional set-up. That trajectory led to a powerful Japanese position in consumer durables. Policy routines in France rested on quite different political logic and drove a market outcome that saw success in large-scale infrastructure technology such as aircraft and a weakness in electronics technologies with rapidly moving markets.

Along the lines argued in section 2, particular national trade and technology patterns can clearly be accounted for by institutional variations. Soskice (1993) has undertaken this effort in an imaginative way extending the historical institutional arguments built in political science and sociology to the innovation systems problem.[26] Using the notion of national institutions and interpreting it through the lens of the microeconomics of institutions he postulates frameworks of incentives and constraints that structure the choices of firms.

The argument sets a class of outcomes to explain by sketching as stylized facts several different product market and innovation strategies (PMISs) that typify different countries. Soskice argues 'there are a range of world markets in most product sectors running from radical innovations through highly sophisticated customized goods and services to medium sophistication differentiated quality production to more or less standardized goods which sell on marketing and targeting expertise, to commodity production'. These different market segments represent quite different firm strategies. The contention is that typical companies based in different advanced countries position themselves at different points on that product range. Where they position themselves will 'depend on their comparative institutional advantage'.

A historical institutional analytic strategy is required to make the case for national systems of innovation intellectually robust. Importantly, whether the particular initial formulation Soskice proposes of PMISs tied to specific institutionally facilitated relationships proves correct or not, the underlying enterprise is essential. Let us outline Soskice's logic and conjectures.

- First, the firm must choose a product market and innovation strategy (PMIS). The firm here consists of top management attempting to

[26] One difference that seems important to Soskice and myself is whether the framework of incentives and constraints in itself generates consistent firm strategies or whether the frameworks create initial actor behaviors and the interaction of those behaviors in turn generates a market logic that induces firm behavior.

organize problem on-going relations with its employees (researchers, skilled manual employees), with other companies (including customers, suppliers, competitors) and with the owners of the company.

- **Second**, firms operate within national frameworks of incentives and constraints (NFIC). The elements of the national frameworks of incentives and constraints—finance, labor market, market rules and company relations—define the pattern of incentives and constraints. Those patterns generate typical firm strategies in particular countries.
- **Third**, the NFIC induces nationally distinctive firm strategy, distinctive PMIS. Each PMIS requires different relationships.
- **Fourth**, institutional structures and the NFIC that they constitute, operate to restrict the types of relationships that are possible in a particular political economy. NFIC, defined by the institutional arrangements, makes some relationships in the economy easy and others difficult. There are critical relationships with customers, suppliers, managers, non-managerial employees and financiers. For example firm investments in skilled workers require particular structures in labor markets and relations with related firms. Analytically, the different relationships involve resolution of classes of problems. The institutional arrangements, the institutional structure of the economy, facilitate (or impede) collective action problems, contracting uncertainties and principal agent complexities.

Are There Competing National Patterns of Growth?

Historically rooted institutional arrangements certainly channel and direct technological bets and successes. By channeling and directing those bets, a nation's institutions contribute to the creation of national trajectories. As important, since institutions in essence select the character of those bets, the character of the institutions must be part of the specific form of different national trajectories. More importantly, however, the institutional structures which lay down distinctive patterns of cost and reward induce distinctive national market logics and firm strategies. Soskice contends that these national frameworks (NFICs) create distinctive national product market and innovation strategies (PMISs).

Two questions assert themselves at this point. First, do distinct national technological trajectories imply distinct national growth possibilities? It is not simply a matter of whether a dollar of investment in one economy can have different results and possibilities. Rather, one must examine the 'fit' between the institutional capacities and the possibilities in the global market. Second, the capacities of one national institutional system may imply

strengths or weaknesses for its firms in competing against enterprises whose core product and innovation strategies emerge from another system. Indeed the character of the interaction of national systems, as discussed in section 2, becomes a significant issue. Both of these questions push analysis toward strategic analysis of company interaction in competitive markets, not just aggregate studies of the outcomes of those competitions. Growth can no longer be understood in a technologically or institutionally disembodied manner.

4. *Thinking about Institutions*

Let us revisit the argument for a moment. Distinct national paths of economic development and particular technological trajectories are an outgrowth of the institutionally specific context within which each economy operates. The particular historical course of each nation's development creates a political economy with a distinctive institutional structure for governing the markets of labor, land, capital and goods. That national institutional structure shapes the dynamics of the political economy and sets boundaries within which government policies and corporate strategies are chosen. It acts as a system parameter creating a national political economy. Predictable patterns of policy and strategy emerge. That is, the institutional structure induces particular kinds of corporate and government behavior by constraining and by laying out a logic to the market and policy-making process that is particular to that political economy. These typical strategies, routine approaches to problems and shared-decision rules create predictable patterns in the way governments and companies go about their business in a particular national political economy. Certainly there will be variety within a particular polity; but its common national features give character and provide limits to that diversity. Those national institutions, routines and logics represent a distinct capacity to address particular sets of tasks.

The growth story has turned to the processes of technological development and innovation. The vocabulary may be one of firm searches (Nelson and Winter), new recipes (Romer), information processes (Stiglitz) or some other formulation. Whatever the vocabulary, the moment the growth story begins to talk of technology and innovation it presupposes a discussion of national institutional structures, national frameworks of incentive and constraint, which specify the relationships in the economy and define the product and innovation strategies available to firms. In this article, the discussion of national systems of innovation has been used to show how historical institutional arguments must be inserted into the conversation. Empirically there is evidence of distinct national technological trajectories. The questions are

why the trajectories exist and why they have particular form. The existing national systems arguments have very severe limits. Either they are so narrow as to avoid the real questions of how national contexts affect firm strategy or so broad that they would allow the plumber and the kitchen sink he is working on into our list. Equally important, although evolutionary theories rooted in the firm's behavior can demonstrate that trajectories should occur, they cannot even begin to suggest what form, that is shape, they would take. To do so an institutional theory is required.

But what is the news here? Economics already has a set of its own arguments about institutions. But the institutional approach presented here is quite distinct from that traditional within economics. It permits us to argue about historically rooted national lines of economic development and about the institutional foundations of economic growth. And it does so because it approaches the problem of institutions from a different vantage than the economic arguments that have been exported to other social sciences with such powerful influence. The contention is not that the one approach is 'better' than the other but rather that they serve different purposes. The nature of the logic and claims of a historical institutionalism need to be clarified in this conclusion.

The Debate about Institutions

This institution-based view of developmental trajectories demands in turn a theory of their nature, dynamic and origin. There are a series of quite separate conversations about institutions that complicate locating the character of the argument elaborated here; and a dialogue among the different discourses about institutions is difficult. They have in common a concern with institutions, structures, incentives and constraints as an approach to explaining behavior. Similar on the surface they differ profoundly in their conception of the origin, dynamic and consequences of institutions.

Economists tend to see institutions through the lens of the rational actor. For them and those who adopt the approach of the economists, institutions reflect the possibilities, interests and consequently actions of the multiple individual actors. Institutions spring up from the dynamics of a Lockean state of nature. By contrast the 'new' institutionalism has a Tocquevillian twist.[27] It argues that the sources and consequences of institutions cannot be reduced to economic interests or interpreted exclusively through economic analysis. As important, economic interest cannot simply be understood as maximizing efficient operations; that is, the analysis of efficiency will not

[27] See Alexis de Tocqueville, *Democracy in America* and *The Old Regime and the French Revolution*; John Locke, *Of Civil Government: Second Treatise*.

reveal the objectives or calculus of the actors. That is, interests themselves are given form by their institutional context.

Different analytic frames, different paradigms, are often not simply right or wrong. Rather they represent particular spotlights focused in a specific way that can highlight some things but inevitably leaves others in the shadow.[28] Because paradigms represent different lenses or different focus, they cannot be simply blended. They rest on different presumptions. However, they can be situated in relation to each other and, in fact, particular processes, such as firm behavior, have several dimensions. Like actors on a stage some facets of a problem are best illuminated by one spotlight and other facets by another. Consequently while paradigms cannot be blended, behaviors or processes can be segmented to employ these several spotlights. These analytic alternatives address different aspects of a particular situation. The task therefore is to segment a problem into its components so that the appropriate tools can be used.

The distinct lines of reasoning, and the ways to segment problems, are evident when we consider specific issues.

The origins of institutions When we trace a narrative about the origins of institutions, the divergence in analytic stance is evident. A first perspective, rooted in microeconomics, assumes a Lockean state of nature. It explains the creation and organization of institutions in terms of the interests of particular individuals. Rational choices of microeconomic maximizing individuals are the basis for calculating interest. Olson (1982) posits the 'collective action problem', asking what brings individuals to act together. When he applies the notions to party and political interest groups, he posits that Lockean starting point. Time permits an accumulation of rent seeking groups that represent a form of economic arteriosclerosis that slows growth. The mechanisms that generate broadly organized growth sustaining alliances cannot be analyzed within the original framework.

Other microeconomic based approaches do not seek explanation of the origins of the institutions but they examine or seek explanation in adaptive efficiency. As known, Williamson (1991) builds an organizational microeconomics 'transaction-cost analysis' by positing agents (individuals) who seek to arrange their transactions in the most efficient manner. He also begins with a world of individuals. Implicit in Williamson is the notion that the only reason why advanced industrialized countries have economic market systems with firms of more than one person is to reduce high transaction costs. Those transaction costs are generated by 'the transfer of a good or

[28] Suzanne Berger makes this case particularly eloquently.

service across a technologically separable interface'. Such costs are created by three forces: asset specificity, bounded rationality and opportunism. Asset specificity is defined in terms of the idiosyncratic nature of the object of the transaction (as the knowledge or other investment of one set of actors that is specific to the transaction that is being considered, in a slightly different vocabulary). Bounded rationality refers to the fact that actors can only absorb a certain amount of information and thus need to make decisions that control for their information capacities. Many contracts are incomplete. Opportunism, therefore, refers to the fact that individual actors will have incentives to exploit asymmetric information for their own interest (Williamson, 1991). Furthermore, contracts are not generally self-enforcing. Certainly both the problem of generating collective action and of structuring appropriate contracting arrangements to minimize transaction costs are significant questions that drive behavior and shape institutions.

But social life does not begin in a state of nature and cannot be understood effectively as if it did. Nor can social behavior be understood fully by simply positing an existing set of institutions that bound choice at one moment. The initial focus of many organizational analysts on a single case, the US one, tends to reinforce the tendency not to explore the origins of the institutional structures that concern them.

The contrasting vision presented here argues that contemporary political economies operate within a set of national institutions whose origins matter to their influence on behavior. Those institutions were constructed by the politics of building a nation-state and responding to sharp economic crises that threaten social position, not simply by the problem of organizing innovation and production. Crucially, the resulting institutions not only channel interests but affect the very definition of interests that drive behavior. Consider, for example, France. The French centralized structure reflects the historical route by which kings, seeking mechanisms of control and taxation, created a state structure and a revolution created a nation. That centralized structure so defined group interests that after the revolution there were few advocates of local power as means to practical ends. Rather the push for deconcentration of administrative authority (not really the power to tax and spend that we associate with local power in the USA) came when, overwhelmed by administrative demands, the central bureaucracy itself launched reforms (Gourevitch, 1980). The very destruction of local power, which was necessary for the modernizing elites to force post-World War II growth, later precluded local initiatives and entrepreneurial responses to shifts in the global economy in the 1980s (Zysman, 1983). By contrast, in the case of the German nation the community preceded the creation of the German State. That national state was forged by Bismarck who used external threat to

compress pre-existing principalities into a single political entity. Those principalities retained their identity and formed the basis of local power in modern Germany. The logic of contemporary economic life emerged along very different paths in different German localities. Indeed the diversity of industrial production, the coexistence of an economy of large giants and the zones of industrial flexibility are rooted in local histories (Herrigel, 1989).

Put differently, the institutional structure of political economy, rooted in the original politics of industrialization and modernization, bounds the problems that concern Olson, Williamson and others. The basic structure of the national state creates options that delimit solutions within society. A long literature tells the story of the accommodation of French economic and social life to its centralized administrative and political structures.

Social context and organizational solutions. Let us extend this distinction between the socially 'naked' organization and the socially 'embedded' organization. The 'embedded' organization is in a social structure of other institutions that facilitate as well as impede its activities.[29] Consider how an organization finds solutions to the need for collective action, the effort to devise appropriate contracting relations or to resolve the tension between principals and agents. For the socially naked organization the solutions must be imagined to be found within the individual organization or between the organizations directly affected by the problem. In that case the analytic focus is on the particular organizations and the incentives that motivate actors within them as well as contracting law that defines the range of their arrangements. The law becomes the organizational link to the world at large. Conversely for the socially embedded organization we can imagine that solutions to these organizational problems can be found in the relations to and resources of the institutions that surround it. These are not alternative perspectives where one can be abandoned in favor of the other. Rather they illuminate different issues.

Consider Japan. The structure of its political economy provides a series of mechanisms for solving collective action problems that the individual firm may confront. Collective action problems do not disappear in Japan (Noble, 1992). Nor are they resolved by some cultural propensity toward consensus and group behavior. As an example consider the extensive number of next-generation technology projects (Samuels and Levy, 1991). There is remarkably little government money in these efforts, and the money is hardly an explanation of private participation. Providing the table and a legitimate meeting room helps, but the government convening power does not consist only of providing the table. It also consists of a series of other influences,

[29] Argued from a different perspective in the sociological literature, see Granovetter (1985).

'carrots' and 'sticks' that encourage participation. The enormous influence of government bureaucrats, past and present, leads some to conclude that they are the most 'decisive factor in shaping day to day decisions of corporate Japan' (Schaede, 1992, p. 33). Certainly the projects reflect the views and interests of the private parties; there is no intent to override private views and substitute a government position. Similarly, *Keiretsu* relations and other ties within Japan help to provide the context for the resolution of particular contracting problems.

Or take Germany. The extensive industrial training programs are crucial to the pattern of customized high quality production that helps underpin German industrial exports. Those training programs must overcome a classic incentive incompatibility problem. If you train, I can hire your worker. If I invest in training, my worker may leave. So neither of us will engage in needed training. The multitude of industry associations creates a form of private management of public life and provides a means of solving this collective action problem without direct government management.

In sum the national institutional context matters powerfully for the resolution of organizational problems. The analysis of the 'naked' firm's problems is instructive about the character of the issues to be resolved. The analysis of the socially embedded firm is required to understand the solutions that emerge. As a result simple proposals that US firms should use German or Japanese solutions is misplaced. The context dictates and constrains the organizational strategies.

Varieties of rationality. Specifying the objectives a rational individual (or firm) will pursue is harder than it seems. Efficiency, greed, power and social position all act as motivations. The rational actor may maximize by creating an institutional structure that solves problems generated by new technologies and permits the efficient implementation of those technologies. Or the rational actor may maximize capturing 'rents'. Those rents may, in an equilibrium world, detract from overall growth by reducing efficiency. Greed may drive market abuses that distort the market. Or, in a Schumpeterian world, those rents may be the temptation that allows the shift from one technological frame to another, thus driving economic development. But the economic objectives that societies and the individuals in them follow are not universal and unchanging. Markets are recent creations; indeed the creation of societies based on market relationships is a very recent historical phenomenon. That 'great transformation', as Polanyi (1944) labels it, involved a radical shift of social and economic relationships. Instead of economic relations being embedded in social relations, social relations began to be derived from market position. That transformation involved the creation

of modern institutions, establishing the institutional foundations of a market society. The social context, the particular character of the market institutions in a specific society, sets the very nature of the 'rational' problem.

Consider two countries in a famous tale told by Gerschenkron (1943). Faced with a flood of US grain on to the world market in the latter part of the 19th century, Danish peasants began to import the grain, feed it to pigs and cows and become dairy farmers. Prussian landlords, the historically famous and significant Junker class, sought political alliances with peasants elsewhere in Germany to create agricultural protection. That Iron–Rye alliance underpinned the course of German political history. Importantly the problem was that the economically most efficient choice—import grain—was incompatible with the social position of the Junkers and the means by which they extracted their 'rents' from the land. Their interests were defined by the character of landlord–peasant relations and their place in the social order (Moore, 1966). For the peasants in other parts of Germany, other alternatives were technically possible.

Certainly rationality depends on the particular social context and—as importantly—modern senses of rationality are recently constructed social facts. The implication is that the implementation of efficiency, the greedy pursuit of rents, the ambitious pursuit of power and the maintenance of social order are intertangled but somewhat separated narratives about social life. They must be understood separately. A single discourse within a single framework simply cannot capture institutional dynamics.

Micro-foundations and macro-processes. Institutions and broad processes of social change certainly have micro-foundations. The 'naked' institution emerging from a state of nature by rational choice and the 'socially embedded' institution are one and the same, but they represent two different narratives whose perspectives highlight different processes within a common story. That is, the arguments built about institutions and historical dynamics should be consistent with notions of the 'rational' dynamics of individual behavior. Inconsistencies are instructive to both those who would build micro-foundations and macro-theories. For those of us who work through the narrative of historical development and the dynamics of national institutional structure, the appropriate analogy might be to high-level computer languages (historical narrative) and the bit-level machine language of the computer (microeconomic narrative). Inherently they must work together, they must be consistent. But the best way of proceeding is not always by reasoning from the particular to the general, from the bottom up. Rather it may be more effective to work from the general structure to the micro-foundations; the translation may best be achieved by the intellectual equivalent of a 'compiler'.

Inconsistencies between the micro-foundations and macro-theories as often point to the limits of theories of rational choice as to errors in broader historical argument. The problem is not with the theories but with how the theories are applied. Issues must be segmented to make appropriate use of the perspectives, not to reject the insight of one or the other as part of an ideological quarrel.

Institutional failures and dynamics. This leads to our final question. How do we identify crucial institutional problems in the development of the advanced industrial countries? Do we work to them from the interior logic of the micro-logic of institutional behavior? In which case we proceed to group the categories of problems such analysis provides—free rider obstacles to collective action, contracting contradictions, appropriability connundrums, principal agent dilemmas. Then if we take these groups and search across our industrial societies we shall undoubtedly find multitudes of instances and examples.

But which instances of free rider obstacles to collective action, contracting contradictions, appropriability connundrums or principal agent dilemmas are of broad significance? Which examples matter? And how do we distinguish them from those that matter less? Microeconomics then is somewhat parallel to machine-level language that drives a computer. Systems designers need a higher-level language to write complex programs. Certainly, the machine-level language must be consistent with those high-level programs. Indeed, computer scientists build compilers to translate automatically the high-level programs into machine language. But the higher-level language is required to identify which issues in a program are critical. So it is in our uses of institutions. Nothing in a micro-theory can identify the instances that are of broader significance. That, it would seem, is inherent and incontrovertible. The identification of critical issues and relations must come from outside the analysis. The broader interpretations must be consistent with individual rationality and motivation. But we do not have a social science 'compiler', and inconsistencies between our theories and individual rationality emerge. Those inconsistencies are themselves useful clues.

Nonetheless many approaches, such as that adopted by Olson in his effort to apply his micro-theories to national problems, attempt to avoid the analytic decision of which problems matter most. His solution is simply to look for the accumulation of problems—such as rent seeking groups—as a sign of broader trouble. The notion that World War II created a political new start by simply uprooting previous interest groupings is limited at best (Olson, 1982). The cross-cutting alliances of which he speaks require a different genre of explanation, one that takes us into a broader theory of

politics. Such a theory cannot in any simple sense be reduced to the economic interests of groups within a society. Such analysis can provide insight but not explanation.

A second approach comes, as we have seen, from the evolutionary theories of growth and innovation. At least in the simplest interpretations based on these theories, technology provides the external driver forcing change in institutional arrangements. As such, analysts are drawn to the excellent work of historians such as Alfred Chandler. Whatever quarrel with or limits to his arguments, his work emphasizes that only an analysis that begins outside the microeconomics of institutions can provide focus to it. Nelson's proposals to build arguments of the coevolution of technology and the organizational structure of the firm are correct. They are simply too limited. They must, as argued earlier, be joined to a theory of the ties between the institutional structure of the economy and the organizational arrangements of the economy.

The 'new institutionalism' of political science and the broader theories of political development are not alternatives to the spotlight provided by microeconomics. They are complements. The analyst ought not to select between different paradigms, each of which has a utility. The task is rather to segment an analytic problem so that the appropriate tools can be used. The problem in this issue is the question of growth. In this article the story has been segmented to highlight the role of historically rooted and national institutions and the roads of development they induce.

5. *Conclusion: The Argument Revisited and Next Research Questions*

The particular historical course of each nation's development creates a political economy with a distinctive institutional structure for governing the markets of labor, land, capital and goods. That national institutional structure shapes the dynamics of the political economy and sets boundaries within which government policies and corporate strategies are chosen. It acts as a system parameter, creating a national political economy. Predictable patterns of policy and strategy emerge. That is, the institutional structure induces particular kinds of corporate and government behavior by constraining and by laying out a logic to the market and policy-making process that is particular to that political economy. These typical strategies, routine approaches to problems and shared-decision rules create predictable patterns in the way governments and companies go about their business in a particular national political economy. Certainly there will be variety within a particular polity; but its common national features give character and provide limits to

that diversity. Those national institutions, routines and logics represent a distinct capacity to address particular sets of tasks.

These notions are applied to the debate about national systems of innovation. Empirically there is evidence of distinct national technological trajectories. The questions are why the trajectories exist and why they have particular form. The national systems arguments have very severe limits. Either they are so narrow as to avoid the real questions of how national contexts affect firm strategy or so broad that they would allow the plumber and the kitchen sink he is working on into our list. Equally important, although evolutionary theories rooted in the firm's behavior can demonstrate that trajectories should occur, they cannot even begin to suggest what form, that is shape, they would take. To do so an institutional theory is required. Such a theory permits us to apply both evolutionary and new growth arguments about economic development to particular national cases.

Four sets of research problems are suggested by this approach. First, an argument about the institutional structure of a national economy must naturally ask what are the crucial features of a national system, which economic/political behaviors they relate to, and the manner in which they influence growth processes. More fully specifying these relations is a first task. Second, we must ask whether the national institutional roots of the market systems will be swept away in the next years by increasing international market connections. In my view the national arrangements are deeply entrenched. There will be change, but what kind of change will it be? Convergence, an erosion of national institutional foundations, would leave countries looking very much alike. Parallel transition in which the countries evolve but along parallel trajectories would leave them distinct. Third, the domestic structure, the national framework of incentives and constraints, as well as the economic interests of the dominant national economy, has always powerfully influenced the organization of the international economy. How then are the characteristic processes of international economic growth influenced during the era of one nation's preeminence? Fourth, how are those international processes affected in this era when there is no single dominant economy, no hegemony but rather a rivalry among several economically more or less coequal partners?

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