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**INDUSTRIAL ORGANIZATION AND  
THE NEW INDUSTRIAL POLICY**

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**INDUSTRIAL ORGANIZATION**



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## ABSTRACT

### Industrial Organization and the New Industrial Policy\*

The purpose of this paper is to try to shed some new light on the current industrial policy crisis. This paper proposes that the industrial policy debate is shaped by knowledge about the functioning of the underlying industrial structure, which in turn is the Gegenstand of scholars in the field of industrial economics. The main conclusion is that the current industrial policy dilemma is the result of a shift in the fundamental long-run forces underlying the organization of industries. The declining long-run average cost curves characteristic of manufacturing for the better part of a century have given way to the generation and commercialization of new knowledge as the predominant economic force determining comparative advantage. The traditional instruments of industrial policy – anti-trust, regulation and public ownership – have correspondingly given way to a new set of industrial policies that, rather than focusing on restraining the freedom of large corporations to contract, are devoted to the creation and commercialization of new knowledge.

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## NON-TECHNICAL SUMMARY

During the post-war era the classic instruments of public policy towards business were the focus of the policy debates throughout Western Europe and North America. More recently, however, anti-trust, regulation and public ownership have fallen into disarray. They rouse neither passion nor attention from policy-makers and the public. Those waiting for the de-emphasis of anti-trust, deregulation and waves of privatization of the Reagan-Bush era to be reversed by a Democrat in office have been disappointed. Since these trends actually started with a Democratic Administration in the 1970s, it is not surprising that they have continued independent of the party in office. The same can be said for the United Kingdom. This is because the fundamental problem addressed by these policies – excess profits and prices as a result of market power – no longer ranks among the most pressing policy issues. There was no mention of the harm to consumers from market power in the form of prices and profits that are 'exploitative' in either the last presidential debates in the United States, nor is this being debated in the upcoming elections in Europe.

Rather, the most pressing policy issues on both sides of the Atlantic involve employment generation and growth. Anti-trust, regulation and public ownership have little to say about the most important contemporary economic issues. Many scholars have concluded that the de-emphasis of these three traditional instruments of public policy towards business represents the end of industrial policy. What such a conclusion misses is that industrial policy has not at all faded. Rather, it has simply shifted in three important dimensions. The first is from policies of constraint to policies of enablement. This shift involves a very different set of instruments, where the classic institutions of anti-trust, regulation and public ownership are de-emphasized, but the creation and commercialization of new knowledge becomes the focal point. The second shift involves the focus on inputs, and especially knowledge inputs in the production process rather than targeting outputs and outcomes. The third shift involves a different locus of institutions, away from the national and federal level and towards the state and local level. Taken together, these three fundamental shifts constitute the new industrial policy approach that is emerging throughout Europe and North America.

The underlying reason for the current industrial policy dilemma is a shift in the fundamental long-run forces underlying the organization of industries. The declining long-run average cost curves characteristic of manufacturing for the better part of a century have given way to the generation and commercialization of new knowledge as the predominant economic force

determining comparative advantage. The traditional instruments of industrial policy – anti-trust, regulation and public ownership – have correspondingly given way to a new set of industrial policies that, rather than focusing on restraining the freedom of large corporations.

## 1. Introduction

Industrial policy is currently in a state of crisis. As recently as two decades ago something of a consensus regarding the role of industrial policy in the economy reigned throughout most of Europe and North America. At the heart of government policies towards business lie the triad of regulation, public ownership, and competition policy, or antitrust as the Americans like to call it. The increased irrelevance of competition policy, waves of deregulation and privatization around the globe has left the industrial policy debate in a state of confusion and disarray. For example, F.M. Scherer (1977, p. 977), who served as Director of the Bureau of Economics at the United States Federal Trade Commission (FTC), found the industrial policy debate, “muddled and often contradictory. I frequently felt that if we knew precisely where we’re to go, we could proceed there in a more orderly fashion. But clear objectives were a luxury we seldom enjoyed, ambiguity was our guiding star.” Similarly, Dennis Mueller (1996, pp. 415-416) recently observed that, “The United States has the longest history of antitrust enforcement in the world, over 100 years now. Over this span, U.S. antitrust policy has waxed and waned in its vigor, but on average the U.S. has had the toughest and most vigorously enforced antitrust statutes in the world. In recent years, the wisdom of this policy has been questioned, the government has taken a noticeably more circumscribed approach to enforcing the antitrust laws, and the courts have become more lenient in interpreting them.”

Some would hold that industrial policy is simply an antiquated concept which has lost its relevance in global markets and neo-liberal governments. Others call for a return to

the traditional policy instruments, such as strict anti-monopoly policies and government regulation combined with public ownership.

The purpose of this paper is to try to shed some new light on the current industrial policy crisis. This paper proposes that the industrial policy debate is shaped by knowledge about the functioning of the underlying industrial structure, which in turn is the *Gegenstand* of scholars in the field of industrial economics.

This paper concludes that the current industrial policy dilemma is the result of a shift in the fundamental long-run forces underlying the organization of industries. The declining long-run average cost curves characteristic of manufacturing for the better part of a century have given way to the generation and commercialization of new knowledge as the predominant economic force determining comparative advantage. The traditional instruments of industrial policy – antitrust, regulation and public ownership – have correspondingly given way to a new set of industrial policies that, rather than focusing on restraining the freedom of large corporations to contract, are devoted to the creation and commercialization of new knowledge.

## **2. The Era of Restraint**

### ***2.1. Decreasing Costs***

Prior to the middle of the nineteenth century, production was typically on a small-scale (Chandler, 1977). The minimum efficient scale (MES), or smallest level of output where the minimum average cost was attained was trivial and involved just a handful of employees. Production was typically undertaken in small-scale craft establishments and

was centered around family owned businesses. Piore and Sabel (1984) conclude that prior to the middle of the nineteenth century, a flat average cost curve was not a bad approximation for most firms in most industries.

The fundamental cost structure changed dramatically with the advent of the corporation and the accompanying managerial revolution. The corporation had emerged as the most efficient instrument of resource management during the American industrial revolution. If the application of British inventions had served as the catalyst underlying U.S. industrialization, the revolution in management techniques – the modern corporate structure – enabled its implementation. According to Reich (1983, p. 26), “Managerialism offered America a set of organizing principles at precisely the time when many Americans sensed a need for greater organization and these principles soon shaped every dominant American institution precisely as they helped those institutions become dominant. The logic of routine, large-scale manufacturing, first shaped its original business environment and then permeated the larger social environment.”

Through the organizational structure of the modern corporation, the new managerialism emerging after the U.S. Civil War excelled at amassing large quantities of raw materials, labor and capital inputs, and applying particular manufacturing processes to achieve a very specific use of these resources. The leaps in productivity of U.S. manufacturing during the late 1800s were the product of increased specialization.

The essence of the new managerialism was “command and control of effort.” Labor was considered to be indistinguishable from all other inputs, as long as scientific management was able to “extract a full day’s worth of energy for a full day’s pay”



(Wheelwright, 1985). As tasks became increasingly specialized, the skill level required of workers became less important. What mattered most under the mass-production regime was the consistency and reliability of each precise cog; what mattered least was the decision-making capability of each unit.

The emergence of mass-production, which was made feasible by the organization of the corporation combined with the managerial revolution triggered a dramatic shift in the underlying cost structure of firms and industry. The MES increased dramatically in many manufacturing industries, resulting in a shift in the long-run average cost curve from essentially flat to downward sloping.

The response to a decreasing cost curve had three aspects. First, small scale production was threatened for the first time in American history. Family businesses were confronted by a cost disadvantage vis-à-vis the large-scale corporations, resulting in massive failures and liquidations.

The second aspect involved the massive increases in output as a result of the unprecedented productivity increases generated by large-scale production. This led to chronic downward pressure on prices.

The third aspect involved the emerging large corporations, which generally did not prove capable of mastering the business environment sufficiently to ensure the viability of mass-production. While scientific management provided the means for controlling and assembling resources into specialized production processes, it had little to offer for controlling the external business environment. The stability, continuity and reliability that

constituted the core of successful mass production failed to materialize at the market level. The American large corporation was threatened by market volatility.

Market volatility emanated from the relatively capital-intensive production processes required of large-scale mass-production. Attaining the MES level of output and exhausting scale economies through specialization required historically unprecedented amounts of capital investment. Such investment was rendered particularly risky and vulnerable by two factors. The first was the dependence of profitability and survival upon the achievement of high levels of capacity utilization. Faced with industry excess capacity, firms resorted to *cut-throat pricing* – dropping price below average total cost but above marginal cost – in an effort to maintain capacity utilization. Of course, such a policy pursued independently by each firm resulted in disaster for the entire industry. Scientific management, which could methodically squeeze out the high levels of efficiency based on large-scale production, was impotent in the face of such market volatility (Piore and Sabel, 1984).

The second risk associated with large-scale investment was its vulnerability to technological obsolescence. The viability of any one firm investing in mass production depended upon none of the other firms in the market making quantum-level technological advances. Thus, the corporation was rendered unstable due to its inability to control price through coordinating market output with its rivals and by the devastating effect of being technologically surpassed by rivals (Piore and Sabel, 1984, chapter four).

Just as the organization of the corporation combined with modern management to achieve the coordination of production within the firm, it analogously sought to extend

that control to the external environment. The condemnation of business policies threatening stability – such as *cut-throat pricing* – is reflected in the frontpiece of Eddy's (1912) *The New Competition*: "Competition is War and War is Hell". Kolko (1963, pp. 30-31) quotes an early American Tobacco Company executive lamenting, "Unrestricted competition had been tried out to a conclusion, with the result that the industrial fabric of the nation was confronted with an almost tragic condition of impending bankruptcy. Unrestricted competition had proven a deceptive mirage, and its victims were struggling on every hand to find some means of escape from the perils of their environment. In this trying situation, it was perfectly natural that the idea of rational cooperation in lieu of cut-throat competition should suggest itself."

The first attempts to achieve industry stabilization and offset the *chronically excess output* that precipitates *cut-throat pricing* consisted of outright collusion – agreements either to fix price or to restrict output, or both, enabling prices to be raised. Such agreements were typically implemented under the direction of trade associations. For example, the Bessemer Pig Iron and the Bessemer Steel Associations were formed in the mid-1890s to restrict output and stabilize prices among over 700 companies in the blast furnace, steel work and rolling mill industries. However, as the declining prices in 1894-1895 of most steel-goods indicated, such stabilization attempts proved ineffective.

Having failed at price-fixing, the corporations attempted to attain market stability through consolidation. The drive for stabilization through merger prevailed throughout the economy, culminating in the merger movement at the turn of the century, as documented by Nelson (1959). In 1895 only forty-three firms disappeared as a result of acquisition,

representing a \$41 million merger capitalization. Just three years later, mergers resulted in 303 firm disappearances, for a \$651 million capitalization. U.S. Steel became a giant corporation largely through consolidation and acquisition. The company was created by combining twelve firms, which in turn had been created from merging together some 180 independent companies, with more than 300 plants. However, even such consolidations on a massive scale typically fell short of achieving the desired goal of controlling or at least limiting output and halting the price reductions. According to Kolko (1963, p. 27), “The new mergers, with their size, efficiency, and capitalization were unable to stem the tide of competitive growth. Quite the contrary. They were more unlikely than not unable to compete successfully or hold on to their share of the market.” Although consolidation had succeeded in amassing giant firms, it had not succeeded in providing long-term industry stability by halting the upward spiral in productivity and output and the subsequent downward spiral in prices. Kolko’s conclusion is certainly consistent with the 1919 Supreme Court ruling in *U.S. v. U.S. Steel Corp.*<sup>1</sup>, that “Size alone is not an offense.” Even its massive size and market share of 90 percent in 1901 apparently was not sufficient for U.S. Steel to stem the tide of excess capacity and *cut-throat pricing*.

The era of decreasing costs, ushered in by the advent of the large corporation and the managerial revolution, was therefore characterized by what seemed to be a dismal tradeoff confronting economic policy. There was efficiency and low-costs generated by large-scale production but at the cost of increased economic centralization on the one hand, versus economic decentralization, and political democracy, but at the cost of inefficiency on the other hand. Marx (1912) viewed this tradeoff in a larger dimension,

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<sup>1</sup> *U.S. v. U.S. Steel Corp.*, 251, U.S. 417 (1920).

where capitalism itself was incompatible with democracy. According to Marx, the advantages of large-scale production in the competitive process would lead to small firms inevitably being driven out of business by larger corporations in a never ending race towards increased concentration and centralization: "The battle of competition is fought by the cheapening of commodities. The cheapness of commodities depends, *ceteris paribus*, on the productiveness of labour, and this again on the scale of production. Therefore, the large capitals beat the smaller."<sup>2</sup>

## **2.2. The Policy Response – Constraining Big Business**

The response by the main economic actors of the time -- small and family owned businesses suddenly thrust into an inefficient operating size on the one hand and falling prices in the product market on the other hand, big business caught up in a seemingly endless battle for increasing size or being condemned to extinction, and consumers -- was political. The mandate for restricting the power of big business in general and the freedom of firms to contract more specifically emerged first from the Granger and subsequently the Populist movements. In responding to the demands of the Populist movement, which voiced the disgruntled concerns of affected small businesses, government was ultimately given the mandate to constrain the power of big business. The industrial policy of restricting the freedom of big business to contract was comprised of three major instruments – competition policy or what became known in America as antitrust, direct regulation of big business and public ownership.

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<sup>2</sup> Quoted from Rosenberg (1992, p. 197).

Direct government regulation of big business emerged as a political response to the demands of the Granger and Populist Movements. The particular concern of these political movements focused on the railroad and grain elevator trusts. The populists managed to pressure a number of Midwestern states into enacting laws regulating interstate railroads and grain elevators. One grain elevator owner, Munn, brought a legal suit against the State of Illinois for enacting a law that enabled the state to control the rates charged by grain elevators and warehouses. When the Supreme Court agreed to hear the case, Munn charged that the statute violated the Fourteenth Amendment to the United States Constitution by effectively claiming a portion of his private property in the form of foregone profits in the 1877 Supreme Court decision concerning *Munn v. Illinois*<sup>3</sup>. However, the Court ruled that because the product was *affected with the public interest*, government regulation of business was constitutional.

When the Great Depression of the 1930s hit, the downward pressure on prices and massive scores of bankruptcy only intensified the mandate for regulation. Based on the *Munn* ruling, and often responding to lobbying pressure from firms, electric and telephone utilities were regulated as well as the interstate railroads. However, the *Munn* precedent dictated that government intervention was not constitutional unless the regulated industry produced an essential product and monopoly power existed. This standard was wiped out in the 1934 Supreme Court decision in *Nebbia v. New York*.<sup>4</sup> When Nebbia, who owned a grocery store in New York State, sold two quarts of milk for eighteen cents and included a free loaf of bread with the purchase as a promotional device, he was accused of violating

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<sup>3</sup> *Munn v. Illinois*, 94 U.S. 113, 1877.

<sup>4</sup> *Nebbia v. New York*, 291 U.S. 502, 1934.

a nine-cents-per-quart price minimum which had been established by the New York Milk Control Board. This was during an era when farmers were dumping milk, or better yet, their neighbors milk, into the streets to reduce output and maintain prices. Referring to the *Mum* precedent, *Nebbia*'s defense was that the retail milk industry was not monopolistic, but rather very competitive, and therefore could not be "affected with the public interest." The Supreme Court, in broadening the *Mum* ruling, found this argument to be irrelevant and upheld the state regulation as being constitutional. Thus, the principal emanating from *Nebbia* was that government regulation was constitutional and hence applicable in virtually every market.

Broad scale intervention by the government on behalf of producers, or consumers, wherever deemed appropriate, was validated with the *Nebbia* decision. Within the decade, the federal government established the Civil Aeronautics Boards (CAB) to regulate the entry and pricing by airlines, and extended the jurisdiction of the ICC to include trucking. The airline industry was regulated to prevent cut-throat competition in a fledgling industry (Keeler, 1981), while trucking was regulated to maintain the profitability of railroads (Moore, 1976). Direct economic regulation was subsequently applied to a host of industries, including natural gas, television, oil, cable television and securities.

The Congressional intent underlying the passage of the U.S. antitrust laws has been subject to considerable debate.<sup>5</sup> Mueller (1978) has argued that fears over the

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<sup>5</sup> At one extreme are economists typically associated with the Chicago School, who interpret Congressional intent as to mean economic efficiency. For example, Posner (1976, p. 20) has argued that, "although non-economic objectives are frequently mentioned in the legislative histories, it seems that the dominant legislative intent has been to promote some approximation to the economist's idea of competition, viewed as a means toward the end of maximizing efficiency. Bork (1966, p. 7), after reviewing the legislative history leading to the first antitrust statutes at the end of the nineteenth century,

unmitigated power of big business motivated Congress to enact the *Sherman Act* in 1890. Certainly Mueller's interpretation of Congressional intent is consistent with Senator Sherman, who argued for passage of his 1890 bill, because: "If we will not endure a King as a political power we should not submit to an autocrat of trade with power to prevent competition and to fix the price of any commodity."<sup>6</sup>

As was the case for direct regulation of business, the mandate for antitrust quickly became complicated by the competing interests of consumers, small business and big business. According to Kolko (1963), three different interest groups combined to support the establishment of a federal agency to implement the antitrust statutes. The first group consisted of those generally hostile towards big business, such as farmers and small family-owned enterprises. The second group was comprised of people in big business who felt that some sort of protection from the volatility of market forces and cut-throat competition, in the form of government intervention, was required. The last was a group of intellectuals who argued that government needed to protect the overall population from the power of large corporations.

The third policy response to decreasing cost curves was public ownership. The strongest movement towards public ownership occurred during the 1930s, when the downward pressure on prices due to "excess supply" was the greatest. This was also the period witnessing the greatest expansion of direct regulation and the greatest enforcement

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concur with Posner's conclusion but disagrees that non-economic objectives were even a Congressional goal: "My conclusion, drawn from the evidence in the Congressional Record is that Congress intended the courts to implement only that value we would today call consumer welfare. To put it another way, the policy the courts were intended to apply is the maximization of wealth or consumer want satisfaction."

<sup>6</sup> Statute 209 (1890), Section 1.



of the antitrust statutes to protect business from “excess competition”. Even collusive agreements were allowed for a brief moment during the depths of the Great Depression with the Supreme Court decision in *Appalachian Coals*.<sup>7</sup> Scherer (1970, p. 431) points out, “The Appalachian Coals decision is widely regarded as an anomaly in antitrust law with no status as a precedent.” While the decision was quickly overturned,<sup>8</sup> relegating it to an anomalous footnote in legal history, it is probably more than a coincidence that even explicit collusion was allowed during times made desperate by falling prices and chronic excess capacity.

Thus, in the first half of the twentieth century, the triad of industrial policy instruments – antitrust, regulation and public ownership – provided the American answer to Marx’s (1912) warning that, because of the iron domination of decreasing average costs, “One capitalist kills many,” so that ultimately, “Capitalism bears the seeds of its own self-destruction.”

Interpreting Marx, Alfred Marshall (1923, pp. 176-177) was moved to write that, “Marx and his followers resolved to be practical, and argued that history showed a steadily hastening growth of large business and of mechanical administration by vast joint-stock companies, and they deduced the fatalistic conclusion that this tendency is irresistible; and must fulfill its destiny by making the whole state into lone large joint-stock company in which everyone would be a shareholder.”

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<sup>7</sup> *U.S. v Appalachian Coals*, 1 F. Supp. 339 (1932).

<sup>8</sup> *U.S. v. Socony-Vacuum Oil Co.*, 310 U.S. 150 (1940).

### **2.3. *The Welfare Tradeoff and the Emergence of Industrial Organization***

When the Soviet premier Nikita Khrushchev banged his shoe on the negotiating table of the United Nations, and challenged President John F. Kennedy, “We will bury you,” the West was alarmed. At the heart of Khrushchev’s challenge was not necessarily a military threat, but rather an economic one. After all, the Soviets had beaten the Americans in the space race with the launching of the *Sputnik* just several years earlier; and perhaps even more disconcerting was the growth in Soviet productivity, which appeared to greatly exceed that in the West during the 1950s.

Thus, by the 1960s there was little doubt among politicians, intellectuals and economists about the credibility of the threat from the East. Moore (1992, p. 72) has provided compelling documentation of the “view held widely at the time that Soviet central planning would produce persistently high growth rates into the foreseeable future.” Even as late as 1966, the Joint Economic Committee of the United States Congress warned of a “planned average annual increase in industrial output of 8.0-8.4 percent during 1966-70” in the Soviet Union (Noren, 1966, p. 301). After all, the nations of Eastern Europe, and the Soviet Union in particular, had a “luxury” inherent in their systems of centralized planning – a concentration of economic assets on a scale beyond anything imaginable in the West. For example, before the Berlin Wall fell, the East German economy consisted of 224 firms – *Kombinate*, or combines, -- of which around 180 were in manufacturing. There was essentially one firm, and one firm only for each major manufacturing industry. This degree of concentration and centralization was the rule and not the exception throughout Eastern Europe.

Although there may have been considerable debate about what to do about the perceived Soviet threat during the Cold War, there was little doubt at that time that the manner in which enterprises and entire industries were organized mattered. Even more striking, when one reviews the literature of the day, there seemed to be near unanimity about the way in which industrial organization mattered. It is no doubt an irony of history that a remarkably similar version of what Rosenberg (1992, p. 197) has termed the “giantism embedded in Soviet doctrine,” fueled by the writings of Marx and ultimately implemented by the iron fist of Stalin, was also prevalent throughout the West. Schumpeter (1942, p. 134), for example, predicted that due to their ability to exploit scale economies, the industrial structure would inevitably consist solely of large corporations: “Since capitalist enterprise, by its very achievements, tends to automatize progress, we conclude that it tends to make itself superfluous -- to break to pieces under the pressure of its own success. The perfectly bureaucratic giant industrial unit not only ousts the small- or medium-sized firm and ‘expropriates’ its owners, but in the end it also ousts the entrepreneur and expropriates the bourgeoisie as a class which in the process stands to lose not only its income but also, what is infinitely more important, its function.”

The post-war period represented the pinnacle of mass-production (Chandler, 1977). A massive literature had identified a clear long-term trend towards increased concentration in economic activity both at the aggregate level as well as for individual markets. For example, the percentage of total U.S. manufacturing assets accounted for by the largest 100 corporations increased from about 36 percent in 1924, to 39 percent after the Second World War and to over 50 percent by the end of the 1960s. This caused F.M. Scherer to

conclude (1970, p. 44), “Despite the (statistical) uncertainties, one thing is clear. The increasing domestic dominance of the 100 largest manufacturing firms since 1946 is not a statistical illusion.”

Consistent with the trend towards increased concentration was the shift in economic activity away from small firms and towards large enterprises. The share of employment accounted for by small firms decreased substantially in every major sector of the economy during the post-war period. Perhaps most striking was the decrease in the share of employment accounted for by small firms of nearly 25 percent in manufacturing between 1958 and 1977 (Acs and Audretsch, 1993).

The major industries fueling the engine of American economic success -- automobiles, steel, tires, chemicals, aluminum, and later computers -- were all characterized by an oligopolistic market structure consisting of just a handful of dominant firms resulting in high and increasing rates of concentration (Scherer, 1970).

There was a distinct social analog to support an industrial structure so dependent upon large corporations. This was the era of the “man in the gray flannel suit” and the “organization man,” when virtually every major social and economic institution acted to reinforce the stability and predictability needed for mass production (Chandler, 1977; and Piore and Sabel, 1984).

The first two decades of the Post-War period was characterized by continued concern and vigilance against the threat to democracy posed by rising economic

concentration. This concern is expressed in a broad range of Congressional Hearings, the enforcement record of the antitrust agencies as well as decisions handed down by the U.S. Supreme Court. For example, the Committee on the Judiciary of the U.S. House of Representatives published the influential *Study of Monopoly Power* in 1950. Similarly, the United States Senate held and published hearings on *Economic Concentration* in 1964. Jesse Markham (1965, p. 166) concluded from his reading of the Congressional testimony leading up to passage of the *Celler-Kefauver Amendment* to the Clayton Act in 1950, “Whatever else Congress may have had in mind when it amended that statute, it is clear from the Senate and House reports on the bill that one of its purposes was to check the rise of market concentration.”

In the high water mark against the possession of market power in 1948, the Court ruled that “Congress... did not condone good trusts and condemn bad ones; it forbade all.”<sup>10</sup> Unless a firm could demonstrate that market power was not “thrust upon it” due to “superior skill, foresight and industry,” the Court would infer an intent to monopolize and find a violation of the Sherman Act. Similarly, the strictest ruling against mergers was made by the Supreme Court in 1962,<sup>11</sup> which branded horizontal mergers as being virtually per se illegal, and lasted until the Court loosened its interpretation in 1974.<sup>12</sup> The Court’s justification for its strict prohibition against horizontal mergers, and similar strict measures against vertical mergers was, “We cannot avoid the mandate of Congress that

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<sup>9</sup> For a description of the social implications of an industrial structure centered upon big business, see Whyte (1960) and Riesman (1950).

<sup>10</sup> *U.S. v. Aluminum Co. of America*, 148 F. 2d 416 (1945). Note that in this case the second Circuit Court served as a “court of last resort”, or substitute for the U.S. Supreme Court, because several of the justices, who had previously worked with the prosecution, had to disqualify themselves, and the Supreme Court was unable to meet the necessary quorum of six justices to hear the case.

<sup>11</sup> *Brown Shoe Co. v. U.S.*, 370 US 294 (1962).

tendencies toward concentration in industry are to be curbed in their incipiency.”<sup>13</sup> This ruling established the strict precedent that monopoly power in its incipiency which could result from the merger was sufficient to disallow the acquisition. The Court also made rulings issuing the tightest restraints on product- and geographic-extension mergers.<sup>14</sup> This was the same period that saw the Federal Trade Commission undertake its most aggressive cases against tacit collusion or what was euphemistically termed as a *shared monopoly* in a 1972 case against the Cereal Companies.<sup>15</sup> Similarly, with the *Schwinn* case in 1967, the Court ruled that vertical restrictions imposed by manufacturers on retailers constituted *per se* violations of the antitrust laws.<sup>16</sup> A decade later this decision had also been significantly weakened.<sup>17</sup>

The period of the strongest government intervention against antitrust came within a relatively small window of time of approximately 12 years in the late 1950s and early 1960s. While this reflected national concern about the threat to democracy posed by increased concentration and the centralization of economic activity, at the same time concern about the ability of the country to compete against the Soviet Union was also growing.

Perhaps the ascendancy of industrial organization as a field in economics during this period came from the recognition not only by scholars but also by policy makers that

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<sup>12</sup> See for example *U.S. v. General Dynamic Corp.*, 415 U.S. 486 (1973).

<sup>13</sup> *Brown Shoe Co. v. U.S.*, 370 US 294 (1962), p. 345.

<sup>14</sup> See *FTC v. Consolidated Foods Corp.*, 380 U.S. 592 (1965); *U.S. v. Falstaff Brewing Corp.*, 410 U.S. 526 (1973); and *FTC v. Proctor & Gamble Co.*, 386 U.S. 568 (1967).

<sup>15</sup> FTC complaint against Kellogg, General Mills, General Foods, and Quaker Oats. Docket No. 8883, filed 26 April, 1972. The Quaker Oats Company was subsequently dropped from the complaint.

<sup>16</sup> *U.S. v. Arnold Schwinn & Co. et al.*, 388 U.S. 365 (1967).

<sup>17</sup> *Continental TV Inc. et al. V. GTE Sylvania, Inc.*, 433 U.S. 36 (1977).

industrial organization matters. It became the task of the industrial organization scholars to sort out the issues involving this perceived trade-off between economic efficiency on the one hand and political and economic decentralization on the other. The scholars of industrial organization responded by producing a massive literature focusing on essentially three issues: (i) how much economic concentration is there? (ii) what are the economic welfare implications of an oligopolistic market structure? and (iii) given the evidence that economic concentration is associated with efficiency, what are the public policy implications? A characteristic of this literature was not only that it was obsessed with the concentration/oligopoly question but that it was essentially static in nature. There was considerable concern about what to do about the firms and existing organization of industry, but little attention was paid to where they came from and where they were going.

Oliver Williamson's classic 1968 article published in the *American Economic Review*, "Economies as an Antitrust Defense: The Welfare Tradeoffs," became something of a final statement demonstrating this seemingly inevitable tradeoff. On the one hand, gains in productive efficiency resulting from greater exploitation of scale economies could be obtained only at the cost of increased concentration. On the other hand, gains in terms of competition could be only be achieved at the cost of sacrificing scale economies as a result of decentralizing policies, such as antitrust. It did not seem possible to have both simultaneously, certainly not in Williamson's completely static model.

Pessimists became alarmed when confronted by this tradeoff. Perhaps the west would, after all, be buried by the East -- productivity gains and a surge of economic growth emanating from the overpowering Soviet combines would simply overwhelm the

outscaled firms in the West, burdened with antiquated constraints such as antitrust laws. By contrast, in an effort to achieve both the efficiency needed to compete with the Soviet Union but avoid the threat posed by massive economic concentration, optimists such as John Kenneth Galbraith rejected the antitrust approach in favor of government regulation and public ownership. Regarding East-West relations, Galbraith spoke of a *convergence* between the communist systems of Eastern Europe and the Western style of *managed capitalism*. In his theory of countervailing power, Galbraith viewed the power of big business as being held in check by big labor and by big government. It seemed that both the East and the West were converging toward economies dominated by a handful of powerful enterprises, constrained only by the countervailing powers of the state and workers. The only “trivial” difference would be the ownership.

Thus, the fundamental issue of public policy towards business during the era of decreasing costs was how to live with the apparent trade-off between concentration and efficiency on the one hand, and decentralization and democracy on the other. The public policy question of the day was, *How can society reap the benefits of the large corporation in an oligopolistic setting while avoiding or at least minimizing the costs imposed by a concentration of economic power?* The policy response was to constrain the freedom of firms to contract. As explained above, such policy restraints typically took the form of public ownership, regulation and competition policy or antitrust. At the time, considerable attention was devoted to what seemed like glaring differences in policy approaches to this apparent trade-off by different countries. France and Sweden favored government



ownership of private business.<sup>18</sup> Other countries, such as the Netherlands and Germany, tended to emphasize regulation.<sup>19</sup> Still other countries, such as the United States, had a greater emphasis on antitrust. In fact, most countries relied upon elements of all three policy instruments. While the particular mix of instruments may have varied across countries, they were, in fact, manifestations of a singular policy approach – how to restrict and restrain the power of the large corporation. What may have been perceived as a disparate set of policies at the time appears in retrospect to comprise a remarkably singular industrial policy approach --constraining the freedom of large corporations

### **3. The Era of Enablement**

#### **3.1. *The Knowledge-Based Economy***

##### 3.1.1. The Traditional Inputs and Comparative Advantage

The *Heckscher-Ohlin-Samuelson model* of international trade is one of the most powerful theories in economics. It has been, and remains, the foundation for understanding international trade flows. As Magee (1989) points out, based on the assumption of the traditional factors of production of land, labor and capital, the theory “states that countries export what they do best and import what they do worst.” It therefore came as something of a shock when what became known as the *Leontieff Paradox* was published. Leontieff documented that, despite its relative factor abundance of physical capital during the post-war period, the United States was a net importer and not a net exporter of capital-intensive goods.

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<sup>18</sup> See for example Hjalmarsson (1991).

<sup>19</sup> See for example Klodt (1990) and Geroski (1989).

Reconciliation of the empirical evidence provided by Leontieff and the model of factor proportions came in the form of suggesting there are other significant factors of production in addition to the traditional ones of land, labor and capital. These additional factors included R&D (Gruber et al., 1967; Lowinger, 1971; and Vernon, 1966), skilled labor (Keesing, 1966), and human capital (Magee, 1990). These attempts to reconcile the foundation of trade theory with the seemingly contradictory evidence provided by Leontieff and others<sup>20</sup>, resulted in the emergence of a new factor of production – knowledge.

### 3.1.2. The Knowledge Production Function

The traditional or neoclassical approach to growth theory focused on the linkages between the inputs of labour and capital and output in a production model framework (Solow, 1956 and 1957). Economic growth was then explained either by increases in the quantity of the inputs or by the productivity of the inputs. But the neoclassical models could not fully explain variations in growth rates over time for any particular country (time series) and across different countries at any one point in time (cross sectional). The residual, or “unaccounted growth” was attributed to exogenous technological change. This technological change was largely considered to be “manna from heaven”.

The concept of *endogenous growth* embraces a diverse body of theoretical and empirical work that emerged in the last decade. These alternative approaches to growth theory differs from neoclassical growth theory in the emphasis that economic growth is an endogenous outcome of an economic system, and not merely the result of forces that

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<sup>20</sup> Bowen, Leamer and Svickauskas (1988) and Bowen and Svickauskas (1990) show that the Leontief

impinge from the outside. As Romer (1994, p. 3) points out, the endogenous growth theory, “does not settle for measuring a growth accounting residual that grows at different rates in different countries. It tries instead to uncover the private and public sector choices that cause the rate of growth of the residual to vary across countries.” The major contribution of the so-called “new growth theory” has been to endogenize technological change in the process of long-run rate of economic growth. Technological change consists of a number of dimensions, such as research and development (R&D), stock of scientists and engineers, the extent of human capital, labour skills, and learning capacity of firms and individuals. Rather than being purely exogenous, these dimensions of technological change become endogenous in the new growth theory, in that greater rates of growth afford higher levels of R&D investment, superior training of the workforce, better education, etc. (Grossman and Helpman, 1991). The higher levels of these dimensions of technological change lead, in turn, to higher growth rates. Thus, Romer (1986 and 1990) pointed out that there are increasing returns to technological change and endogenous growth.

The starting point most for most theories of innovation is the firm. In such theories the firms are exogenous and their performance in generating technological change is endogenous. For example, in the most prevalent model found in the literature of technological change, the model of the *knowledge production function*, formalized by Zvi Griliches (1979), firms exist exogenously and then engage in the pursuit of new economic knowledge as an input into the process of generating innovative activity.

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paradox holds across a wide range of countries.

The most decisive input in the knowledge production function is new economic knowledge. As Arrow (1962) concludes, the greatest source generating new economic knowledge is generally considered to be R&D. A rather large and consistent literature developed during the 1950s and early 1960s documenting that most of the R&D was undertaken by large corporations, typically in concentrated industries (Scherer, 1991).

### **3.2. *The Policy Response***

#### 3.2.1. Industrial Targeting of Outputs

Not only were large corporations considered to achieve lower costs through the exploitation of scale economies, but the emerging theory and empirical evidence suggested that they were also the engine of technological change and innovative activity. Schumpeter wrote in 1942 (p. 106), “What we have got to accept is that (the large-scale establishment or unit of control) has come to be the most powerful engine of progress and in particular of the long-run expansion of output not only in spite of, but to a considerable extent through, this strategy which looks so restrictive... In this respect, perfect competition is not only impossible, but inferior, and has no title to being set up as a model of ideal efficiency.” A few years later, Galbraith (1956, p. 86) echoed Schumpeter’s sentiment when he lamented, “There is no more pleasant fiction that that technological change is the product of the matchless ingenuity of the small man forced by competition to employ his wits to better his neighbor. Unhappily, it is a fiction.”

One policy response to the emerging view that knowledge was replacing cost minimization as a source of comparative advantage was direct targeting of selected knowledge-based industries. For the first two decades subsequent to the Second World

War, Japan pursued a policy of targeting industries selected for industrial promotion. Pugel (1984) and Goto and Wakasugi (1984), and Okuno-Fujiwara (1991), among others, have concluded that industrial targeting was instrumental in helping Japan catch up to the West. The Foreign Investment Act of 1950 enabled the MITI to exercise considerable control over imported technology by requiring government approval of all transactions involving foreign currency. From 1952 to 1960 the MITI administered its controls in an attempt to encourage the use of foreign technology in industries producing intermediate inputs. From 1960 to 1965 the emphasis shifted towards consumer goods, and from 1966 to 1972 the priority became improvements in technology. The intention of the technology controls was clearly to give priority and direction to purchases of foreign technology. Such technological imports were, with virtually no exceptions, directed into the targeted industries.

Tax policy, and especially the depreciation tax, also served as a major instrument for industrial policy in Japan. Three different schemes existed that permitted higher depreciation allowances, each with the goal of enabling targeted industries to have access to liquidity (U.S. General Accounting Office, 1982 and 1983). According to Ueno (1980, p. 388), "A subsidy is important in itself, but it is more important as a signal indicating that the industry or the product receiving the subsidy is publicly recognized as one under government protection" (1980, p. 388).

A wide range of studies has found empirical evidence that those industries targeted by the MITI exhibited a superior performance in terms of trade and growth. However, whether those observed statistical relationships imply that the MITI's policies were

responsible for the strong Japanese trade performance in the targeted industries cannot be unequivocally ascertained. For example, it is conceivable that the MITI, in fact, had a policy of targeting industries that were relatively strong and likely to succeed in the world market.

Japan was not alone in pursuing an industrial policy of regulation and promotion through targeting. The European response to the recognition that R&D was a key input in knowledge-based economic activity was to target specific industries and even firms. For example, some three decades ago, Servan-Schreiber (1968, p. 153) in a very influential book warned Europeans to beware the “American Challenge” in the form of the “dynamism, organization, innovation, and boldness that characterize the giant American corporations.” According to this view giant corporations are needed to mass the requisite R&D resources for innovation, leading Servan-Schreiber (1968, p. 159) to advocate the “creation of large industrial units which are able both in size and management to compete with the American giants”. According to Servan-Schreiber (1968, p. 159), “The first problem of an industrial policy for Europe consists in choosing 50 to 100 firms which, once they are large enough, would be the most likely to become world leaders of modern technology in their fields. At the moment we are simply letting industry be gradually destroyed by the superior power of American corporations.” As the 1988 *Cecchini Report* made clear, the anticipated economic gains from European integration are largely in terms of cost reduction due to the increases in scale economy realized through rationalization and centralization.

The industrial policy debate in the United States took notice as most of the other developed countries responded to the importance of innovation and technological change in a globalized economy through regulating and promoting big business rather than attacking it. Lester Thurow (1980, p. 146) reflects this view, "The time has come to recognize that the antitrust approach has been a failure... The attraction of the competitive ideal has faded." Because antitrust policy is attributed with hindering, and in some cases actually causing, a deterioration in economic performance (Solow, 1984), it is argued that the need for U.S. firms to maintain international competitiveness has rendered antitrust obsolete: "If the antitrust laws do anything they only serve to hinder U.S. competitors who might live by a code that their foreign competitors can ignore... If we are to establish a competitive economy within a framework of international trade and international competition, it is time to recognize that the techniques of the nineteenth century are not applicable in getting ready for the twenty-first century" (Thurow, 1980, pp. 145-146). What is advocated is unequivocal. Direct regulation should replace the implicit solution of market competition inherent in antitrust: "With the intellectual heartbeat of antitrust dead, regulation remains as the only alternative. Instead of creating competition, we get into the business of trying to control oligopolistic behavior" (Thurow, 1980, p. 127).

Most recently, Jorde and Teece (1991, p. 118-119) argued that, "In our view, antitrust is being rendered increasingly superfluous by dispersion in the sources of innovation and the associated growth in international competition." This challenge to the American policy tradition of a strong reliance on antitrust has gained recognition by policy makers. For example, in 1986 the United States Secretary Commerce under the Reagan

Administration, Malcolm Baldrige, asserted, “We are simply living in a different world today. Because of larger markets, the costs of research and development, new product innovation, marketing, and so forth...it takes larger companies to compete successfully.”<sup>21</sup> Baldrige based his argument on the observation that the American share of the largest corporations in the world had fallen considerably between 1960 and 1984. He warned that programs promoting the large-scale enterprise must “... not be stopped by those who are preoccupied with outdated notions about firm size.” Baldrige’s concerns were more than empty rhetoric. The Reagan Administration proposed fundamental changes in the antitrust laws, effectively eliminating the antitrust statutes as a means of enhancing the international competitiveness of U.S. firms.<sup>22</sup> It was argued that, “...if our industries are going to survive, there will have to be additional consolidations to achieve needed economies of scale.”

### 3.2.2. The Knowledge Production Function Reconsidered

As has been made all too clear by the events throughout the former Soviet Union and Eastern Europe in the last decade, neither the pessimists nor the optimists in the West were correct. Neither did the two economic systems converge in the manner that economists like Galbraith had predicted, nor was the West buried by an avalanche of productivity growth and a wave of innovative activity from the East. What happened? What went wrong? A paradox seems to be that the industrial organization of Eastern Europe in general, and the Soviet Union in particular, which was structured around the

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<sup>21</sup> Statement of the Honorable Malcom Baldrige, Secretary, Department of Commerce in Merger Law Reform: Hearings on S. 2022 and S. 2160 before the Senate Committee on the Judiciary, 99<sup>th</sup> Congress, 2<sup>nd</sup> Session, 1986.

<sup>22</sup> “Making Mergers Even Easier.” *New York Times*, 18 November, 1985.



principle of exploiting scale economies to minimize costs and maximize innovation, technological change and ultimately economic growth, resulted in exactly the opposite – stagnation, in terms of both production and technological change.

While the Soviet Union and her Eastern European allies continued to centralize production and research in an effort to continue to exploit scale economies, the west began to abandon an industrial structure devoted towards exploiting scale economies through a process of decentralization. As Nelson (1992), Sylos-Labini (1992) and others point out, the economic failure of the Soviet Union and her Eastern European satellites was to a great extent a failure to participate in the microelectronic revolution, which served as a decentralizing catalyst throughout the West. According to Sylos-Labini (1992, p. 63), “In the last two or three decades, after a number of attempts that failed at decentralizing many activities and of giving more discretionary power to managers, the difficulties rose very rapidly and the Soviet economy entered a period of general crisis. Concentrating economic, organizational, and scientific efforts on military production, the Soviet Union has succeeded, at least for a period, in not losing ground in this sector with respect to the United States and other Western countries. But even this sector – after the latest developments in electronics, which, especially in the United States, owe much to the contribution of small firms – has shown increasing signs of weakness.”

Starting in the mid-1970s, the trend toward increased concentration reversed itself. A wave of studies confirmed that in virtually every developed countries, small firms were accounting for a greater share of economic activity (Acs and Audretsch, 1993; and Loveman and Sengenberger, 1991). For example, Acs and Audretsch (1993) show that

the share of manufacturing employment accounted for by small firms increased in the United Kingdom from 30.1 percent in 1979 to 39.9 percent in 1986; in Germany it increased from 54 percent in 1970 to 58 percent in 1987; and in Italy it increased from 44.3 percent in 1981 to 55.2 percent in 1987.

The relative contribution of small and new firms in two important policy areas has led to a reinterpretation of the fundamental thinking underlying the knowledge production function. The first involves innovation and technological change. A recent wave of studies has identified small and new enterprises as contributors to innovative activity as well as their larger counterparts (Scherer, 1994; Acs and Audretsch, 1988 and 1990; Audretsch, 1995, and Rothwell, 1989), particularly in new and emerging industries, such as biotechnology and computer software. This raises the question, "Where do new and small firms get the innovation producing inputs, that is the knowledge?"

One proposed answer is that, although the model of the knowledge production function may still be valid, the implicitly assumed unit of observation – at the level of the firm – may be less valid. Rather, through knowledge spill-overs, knowledge may be applied and commercialized by a different firm than the one actually generating that knowledge. The transmission of knowledge through the mobility of individuals plays an important role in such knowledge spillovers. A large literature has emerged focusing on what has become known as the *appropriability problem*. The underlying issue revolves around how firms which invest in the creation of new economic knowledge can best appropriate the economic returns from that knowledge (Arrow, 1962). Audretsch (1995) proposes shifting the unit of observation away from exogenously assumed firms to

individuals -- agents with endowments of new economic knowledge. As J. de V. Graaf observed nearly four decades ago, "When we try to construct a transformation function for society as a whole from those facing the individual firms comprising it, a fundamental difficulty confronts us. There is, from a welfare point of view, nothing special about the firms actually existing in an economy at a given moment of time. The firm is in no sense a 'natural unit'. Only the individual members of the economy can lay claim to that distinction. All are potential entrepreneurs. It seems, therefore, that the natural thing to do is to build up from the transformation function of men, rather than the firms, constituting an economy. If we are interested in eventual empirical determination, this is extremely inconvenient. But it has conceptual advantages. The ultimate repositories of technological knowledge in any society are the men comprising it, and it is just this knowledge which is effectively summarized in the form of a transformation function. In itself a firm possesses no knowledge. That which is available to it belongs to the men associated with it. Its production function is really built up in exactly the same way, and from the same basic ingredients, as society's."

When the lens is shifted away from focusing upon the firm as the relevant unit of observation to individuals, the relevant question becomes, *How can economic agents with a given endowment of new knowledge best appropriate the returns from that knowledge?* The appropriability problem confronting the individual may converge with that confronting the firm. Economic agents can and do work for firms, and even if they do not, they can potentially be employed by an incumbent firm. In fact, in a model of perfect information with no agency costs, any positive economies of scale or scope will ensure that the

appropriability problems of the firm and individual converge. If an agent has an idea for doing something different than is currently being practiced by the incumbent enterprises -- both in terms of a new product or process and in terms of organization -- the idea, which can be termed as an innovation, will be presented to the incumbent enterprise. Because of the assumption of perfect knowledge, both the firm and the agent would agree upon the expected value of the innovation. But to the degree that any economies of scale or scope exist, the expected value of implementing the innovation within the incumbent enterprise will exceed that of taking the innovation outside of the incumbent firm to start a new enterprise. Thus, the incumbent firm and the inventor of the idea would be expected to reach a bargain splitting the value added to the firm contributed by the innovation. The payment to the inventor -- either in terms of a higher wage or some other means of remuneration -- would be bounded between the expected value of the innovation if it implemented by the incumbent enterprise on the upper end, and by the return that the agent could expect to earn if he used it to launch a new enterprise on the lower end. Or, as Frank Knight (1921, p. 273) observed more than seventy years ago, "The laborer asks what he thinks the entrepreneur will be able to pay, and in any case will not accept less than he can get from some other entrepreneur, or by turning entrepreneur himself. In the same way the entrepreneur offers to any laborer what he thinks he must in order to secure his services, and in any case not more than he thinks the laborer will actually be worth to him, keeping in mind what he can get by turning laborer himself."

This model analyzing the decision of how best to appropriate the value of new economic knowledge confronting an individual economic agent seems useful when

considering the actual decision to start a new firm taken by entrepreneurs. For example, Chester Carlsson started Xerox after his proposal to produce a (new) copy machine was rejected by Kodak. Kodak based its decision on the premise that the new copy machine would not earn very much money, and in any case, Kodak was in a different line of business -- photography. It is perhaps no small irony that this same entrepreneurial startup, Xerox, decades later turned down a proposal from Steven Jobs to produce and market a personal computer, because they did not think that a personal computer would sell, and, in any case, they were in a different line of business -- copy machines (Carrol, 1993). After seventeen other companies turned down Jobs for virtually identical reasons, including IBM and Hewlett Packard, Jobs resorted to starting his own company, Apple computer.

Similarly, IBM turned down an offer from Bill Gates, "the chance to buy ten percent of Microsoft for a song in 1986, a missed opportunity that would cost \$3 billion today."<sup>23</sup> IBM reached its decision on the grounds that "neither Gates nor any of his band of thirty some employees had anything approaching the credentials or personal characteristics required to work at IBM."<sup>24</sup>

Divergences in beliefs with respect to the value of a new idea need not be restricted to what is formally known as a product or even a process innovation. Rather, the fact that economic agents choose to start a new firm due to divergences in the expected value of an idea applies to the sphere of managerial style and organization as well. One of the most vivid examples involves Bob Noyce, who founded Intel. Noyce had been employed by Fairchild Semiconductor, which is credited with being the pioneering

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<sup>23</sup> "System Error," *The Economist*, 18 September 1993, p. 99.

semiconductor firm. In 1957 Noyce and seven other engineers quit *en masse* from Shockley Semiconductor to form Fairchild Semiconductor, an enterprise that in turn is considered the start of what is today known as *Silicon Valley*. Although Fairchild Semiconductor had "possibly the most potent management and technical team ever assembled" (Gilder, 1989, p. 89), "Noyce couldn't get Fairchild's eastern owners to accept the idea that stock options should be part of compensation for all employees, not just for management. He wanted to tie everyone, from janitors to bosses, into the overall success of the company... This management style still sets the standard for every computer, software, and semiconductor company in the Valley today... Every CEO still wants to think that the place is run the way Bob Noyce would have run it" (Cringley, 1993, p. 39). That is, Noyce's vision of a firm excluded the dress codes, reserved parking places, closed offices, and executive dining rooms, along with the other trappings of status that were standard in virtually every hierarchical and bureaucratic U.S. corporation. But when he tried to impress this vision upon the owners of Fairchild Semiconductor, he was flatly rejected. The formation of Intel in 1968 was the ultimate result of the divergence in beliefs about how to organize and manage the firm.

The key development at Intel was the microprocessor. When long-time IBM employee Ted Hoff approached IBM and later DEC with his new microprocessor in the late 1960s, "IBM and DEC decided there was no market. They could not imagine why anyone would need or want a small computer; if people wanted to use a computer, they could hook into time-sharing systems" (Palfreman and Swade, 1991, p. 108).

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<sup>24</sup> "Die Offene Schlacht," *Die Zeit*, No. 39, 24 September 1993, p. 18.

The second policy area of importance for the reinterpretation of the knowledge production function involves the creation of new jobs. As described in the previous section, the amount of employment accounted for by large firms had been increasing throughout the first three decades of the Post-War period. For example, the amount of employment accounted for by the Fortune 500 doubled between 1954 and 1979, from 8 million to 16 million. This represented a two-thirds increase in the employment share of the Fortune 500, from 34 percent to 58 percent. However, the trend towards increased employment in the largest corporations reversed by the end of the 1970s. The U.S. Labor Department recently reported that as a result of corporate downsizing, "More than 43 million jobs have been erased in the United States since 1979."<sup>25</sup> This includes 24.8 million blue collar jobs and 18.7 million white collar jobs. Between 1980 and 1993, the Fortune 500 eliminated 4.7 million jobs, or one quarter of their work force (Audretsch, 1995).

How has the United States been able to more than offset the impact of corporate downsizing combined with a loss of competitiveness in numerous industries which traditionally had high levels of employment? New employment has been generated through the application of technological knowledge in new industries. It is in the early stages of an industry where the diffusion of technological knowledge is the most costly and the least viable. But because a new technological paradigm is required, it is new and small firms that are the engine of economic growth in new industries and in creating the new jobs.

The organization of industry in the United States has been transformed in a relatively short period of time. A number of corporate giants such as IBM, U.S. Steel,

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<sup>25</sup> "The Downsizing of America." *New York Times*, 3 March, 1996, p. 1.

RCA, and Wang have lost their aura of invincibility. Only slightly more than a decade ago, Peters and Waterman, in their influential best-selling management book, *In Search of Excellence: Lessons from America's Best run Companies*, identified IBM as the best-run corporation in America. What they failed to anticipate was the breathtaking emergence of new startups that barely existed while their book was being written, such as Microsoft, Intel, Gateway, Dell, and Compaq Computer. In the 1950s and 1960s it took two decades for one-third of the Fortune 500 to be replaced. In the 1970s it took the entire decade to replace the Fortune 500. By contrast, in the 1980s it took just five years for one-third of the fortune 500 to be replaced (Audretsch, 1995).

Perhaps even more impressive than the handful of new enterprises that grow to penetrate the Fortune 500 are the armies of startups that come into existence each year – and typically disappear into oblivion within a few years. In the 1990s there are around 1.3 million new companies started each year (Audretsch, 1995). The U.S. economy has become an economy characterized by a tremendous degree of turbulence (Davis et al., 1996a and 1996b). It is an economy in motion, with a massive number of new firms entering each year, but only a subset surviving for any length of time, and an even smaller subset that can ultimately challenge and displace the incumbent larger enterprises.

### 3.2.3. Targeting Knowledge Inputs

The policy response to this new view of the knowledge production function has been to shift away from targeting outputs to targeting selected inputs. In particular, this involves the creation and commercialization of knowledge. Examples include the promotion of joint R&D programs, education and training programs, and policies to



encourage people to start new firms. As Saxenian (1985, p. 102) points out, "Attracting high-tech has become the only development game of the 1980s." Justman (1995) and Justman and Teubel (1986) show how investment in infrastructure provides an important source of growth.

The provision of venture and informal capital to facilitate the creation and growth of new firms has replaced concern about the market power of existing ones in policy debates (Hughes, 1997; Mason and Harrison, 1997). The lack of finance capital for new ventures has been blamed for the inability of Germany and France to shift economic activity into new industries that generate high-wage employment. One of the most repeated phrases on the pages of the business news over the last few years has been "Put Bill Gates in Europe and it just wouldn't have worked out."<sup>26</sup>

Policy efforts to address the most pressing contemporary economic problems have focused on enablement rather than constraint. Emphasis on enabling firms and individuals to create and commercialize new knowledge is not restricted to any single country or set of countries. Laura Tyson (1994), former chair of the Council of Economic Advisors in the Clinton Administration, recently emphasized the importance of government policies to promote entrepreneurship and new-firm startups in the former Soviet Union. Similarly, as unemployment in Germany surpassed four million, and stood at nearly eleven percent of the labor force, it is not surprising the Chancellor Helmut Kohl would undertake action to spur the creation of new jobs. What is more surprising is the main emphasis on new and

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<sup>26</sup> "Where's the Venture Capital?" *Newsweek*, 31 October, 1994, p. 44. Similar sentiment was expressed by Joschka Fischer, parliamentary leader of the Green Party in Germany, who laments, "A company like

small firms announced by the Chancellor in the *Initiatives for Investment and Employment*<sup>27</sup>. The first and main point of the Chancellor's Program consists of a commitment to the "creation of new innovative firms."<sup>28</sup> The rationale underlying this policy approach by the Chancellor is stated in the Program: "New jobs are created mainly in new firms and in small- and medium-sized enterprises."<sup>29</sup>

Audretsch and Feldman (1996) argue that industrial policies targeting the production and commercialization of new economic knowledge will have a greater impact on particular regions and not diffuse rapidly across geographic space. They point out that knowledge spillovers are a key source of new knowledge generating innovative activity, but due to the tacit nature of that knowledge, knowledge flows tend to be geographically bounded. Although the cost of transmitting information has become invariant to distance, the cost of transmitting knowledge, and especially tacit knowledge, rises with distance. By creating regions of knowledge-based economic activities, government policies can generate highly concentrated innovative clusters.

As long as the major policy issue was restricting large, oligopolistic firms in command of considerable market power, a federal or national locus of control was appropriate. This is because the benefits and costs derived from that market power are

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Microsoft would never have a chance in Germany" ("Those German Banks and Their Industrial Treasures," *The Economist*, 21 January, 1994, 77-78).

<sup>27</sup> This was announced as the Aktionsprogramm fuer Investitionen und Arbeitsplaetze ("Soziale Einschnitte und Steuerreform sollen Wirtschaftswachstum anregen: Bundesregierung beschliesst Aktionsprogramm fuer Investitionen und Arbeitsplaetze," *Der Tagesspiegel*, 31 January, p. 1).

<sup>28</sup> The original text of the *Aktionsprogramm* states, "Offensive fuer unternehmerische Selbstaeendigkeit und innovationsfaehigkeit" ("Ein Kraftakt zu Rettung des Standorts Deutschland," *Frankfurter Allgemeine*, 31 January, 1996, p. 11).

asymmetric between the local region where the firm is located and the national market, where the firm sells its product. Not only was production concentrated in one or just several regions, but the workers along with the ancillary suppliers also tended to be located in the same regions. These workers as well as the community at large share the fruits accruing from monopoly power. Systematic empirical evidence (Weiss, 1966) shows that wages are positively related to the degree of market power held by a firm, even after controlling for the degree of unionization. Higher profits resulting from market power are shared by labor. Workers and firms in the region have the same interest.

As Olson (1982) shows, relatively small coalitions of economic agents benefiting from some collective action tend to prevail over a large group of dispersed economic agents each incurring a small cost from that action. The costs of organizing and influencing policy are relatively low for the small coalition enjoying the benefits but large for the group of dispersed economic agents. Government policies to control large oligopolistic firms with substantial market power were not likely to be successful if implemented on the local level. Rather, as Olson (1982) predicts, a regional locus of policy towards business tends to result in the capture of policy by the coalition of local interests benefiting from that policy. Only by shifting the locus of policy away from the region to the national level can the capture of policy by special interest groups be minimized. This is because the negative effects of market power in the form of higher prices are spread throughout the national market while the benefits accruing from that power are locally concentrated.

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<sup>29</sup> "Ein Kraftakt zu Rettung des Standorts Deutschland." *Frankfurter Allgemeine*, 31 January, 1996, p.

The most important institutions administering antitrust policy and regulation have been at the national level. But starting in the Carter Administration in the late 1970s and continuing into the Administrations of Presidents Reagan, Bush and Clinton, antitrust has been de-emphasized and a twenty year wave of deregulation has led to a downsizing and even closure of a number of the former regulatory agencies.

Many economists interpret the downsizing of the federal agencies charged with the regulation of business as the eclipse of government intervention. But to interpret the retreat of the federal government as the end of public intervention is to confuse the downsizing of government with a shifting of the locus of government policy away from the federal to the local level. The last decade has seen the emergence of a set of enabling policy initiatives at the local level. This new type of industrial policy is decentralized and regional in nature. As Sternberg (1996) emphasizes in his review of successful technology policies in the four leading technological countries, the most important industrial policies in the last decades have been local not national. They have occurred in locations such as Research Triangle (Link, 1995), Austin, Texas and Cambridge (U.K.). Sternberg (1996) shows how the success of a number of different high-technology clusters spanning the four most technologically advanced countries is the direct result of enabling policies undertaken at the regional level.

Eisinger asks the question, "Do American States Do Industrial Policy?" in a 1990 article published in the *British Journal of Political Science*. Lowery and Gray (1990) confirm Eisinger's affirmative answer by analyzing the impact of state industrial policy in

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11. The original text reads, "Neue Arbeitsplaeitze entstehen zumeist in neugegruendeten Unternehmen

the United States. They develop a new data set on gross state product and a new measure of state industrial policy activism. Their results suggest that the implementation of industrial policy at the state level tends to promote growth. For example, Feller (1997, p. 289) points out that “in theory and implementation, state technology development programs – as in Texas, Ohio, New York, New Jersey, and Pennsylvania – may be viewed as bands on a wide spectrum from basic research to product development, with the ends reflecting quite divergent state strategies.” The Advanced Research Program in Texas has provided support for basic research and the strengthening of the university infrastructure, which played a central role in recruiting MCC and Sematech and developing a high-tech cluster around Austin. The Thomas Edison Centers in Ohio, the Advanced Technology Centers in New Jersey, and the Centers for Advanced Technology at Case Western Reserve University, Rutgers University and the University of Rochester have supported generic, precompetitive research. This support has generally provided diversified technology development involving a mix of activities encompassing generic research, applied research, and manufacturing modernization through a broad spectrum of industrial collaborators spanning technology-intensive multinational corporations, regional manufactures and new-firm startups.

This shift in the locus of policy is the result of two factors. First, because the source of comparative advantage is knowledge, which tends to be localized in regional clusters, public policy requires an understanding of region-specific characteristics and idiosyncrasies. As Sternberg (1996) concludes, regional strengths provide the major source of innovative clusters. The second factor is that the motivation underlying

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government policy is now growth and the creation of (high-paying) jobs, largely through the creation of new firms. These new firms are typically small and pose no oligopolistic threat in national or international markets. There are no external costs imposed on consumers in the national economy in the form of higher prices as in the case of a large oligopolistic corporation in possession of market power. There is no reason that the promotion of local economies imposes a cost on consumers in the national economy, so that localized industrial policy is justified and does not result in any particular loss incurred by agents outside of the region.

#### **4. Conclusions**

During the post-war era the classic instruments of public policy towards business were the focus of the policy debates throughout western Europe and the North America. However, more recently, antitrust, regulation and public ownership have fallen into disarray. They rouse neither passion nor attention from policy makers and the public. Those waiting for the deemphasis of antitrust, deregulation and waves of privatization of the Reagan-Bush era to be reversed by a Democrat in office have been disappointed. Since these trends actually started with a Democratic Administration in the 1970s, it is not surprising that they have continued independent of the party in office. The same can be said for the United Kingdom. This is because the fundamental problem addressed by these policies – excess profits and prices as a result of market power – no longer ranks among the most pressing policy issues. There was no mention of the harm to consumers from market power in the form of prices and profits that are “exploitative” in either the last

presidential debates in the United States, nor is this being debated in the upcoming elections in Europe.

Rather, the most pressing policy issues on both sides of the Atlantic involve employment generation and growth. Antitrust, regulation and public ownership have little to say about the most important contemporary economic issues. Many scholars have concluded that the de-emphasis of these three traditional instruments of public policy towards business represents the end of industrial policy. What such a conclusion misses is that industrial policy has not at all faded. Rather, it has simply shifted in three important dimensions. The first is from policies of constraint to policies of enablement. This shift involves a very different set of instruments, where the classic institutions of antitrust, regulation and public ownership are de-emphasized, but the creation and commercialization of new knowledge becomes the focal point. The second shift involves the focus on inputs, and especially knowledge inputs in the production process rather than targeting outputs and outcomes. The third shift involves a different locus of institutions, away from the national and federal level and towards the state and local level. Taken together, these three fundamental shifts constitute the new industrial policy approach that is emerging throughout Europe and North America.

## References

- Acs, Zoltan J. and David B. Audretsch, 1988, "Innovation in Large and Small Firms: An Empirical Analysis," *American Economic Review*, 78(4), 678-690.
- Acs, Zoltan J. and David B. Audretsch, 1990, *Innovation and Small Firms*, Cambridge: MIT Press.
- Acs, Zoltan J. and David B. Audretsch, 1993, *Small Firms and Entrepreneurship: An East-West Perspective*, Cambridge: Cambridge University Press.
- Ageev, Alexander I., Mikhail V. Gratchev and Robert D. Hisrich, 1995, "Entrepreneurship in the Soviet Union and Post-Socialist Russia," *Small Business Economics*, 7(5), October, 365-376.
- Arrow, Kenneth J., 1962, "Economic Welfare and the Allocation of Resources for Invention," in R.R. Nelson (ed.), *The Rate and Direction of Inventive Activity*, Princeton: Princeton University Press, pp. 609-626.
- Audretsch, David B., 1995, *Innovation and Industry Evolution*, Cambridge: MIT Press.
- Audretsch, David B. (ed.), 1998, *Industrial Policy and International Competitiveness*, Volumes I, II and III, London: Edward Elgar.
- Audretsch, David B. and Maryann P. Feldman, 1996, "R&D Spillovers and the Geography of Innovation and Production," *American Economic Review*, 86(3), June, 630-640.
- Audretsch, David B. and Paula E. Stephan, 1996, "Company-Scientist Locational Links: The Case of Biotechnology," *American Economic Review*, 86(3), June, 641-652.
- Baldwin, John and Garnett Picot, 1995, "Employment Generation by Small Producers in the Canadian Manufacturing Sector," *Small Business Economics*, 7(4), 317-331.
- Baldwin, John, 1995, *The Dynamics of Industrial Competition: A North American Perspective*, Cambridge: Cambridge University Press.
- Bork, Robert H., 1978, *The Antitrust Paradox: A Policy at War with Itself*, New York: Basic Books.
- Bowen, Harry and Leo Sveikauskas, 1989, "Inter-Industry Regression Estimates of Factor Abundance," in David B. Audretsch and Michael P. Claudon (eds.), *The Internationalization of U.S. Markets*, New York: New York University Press, pp. 49-71.
- Bowen, Harry P., Edward E. Leamer, and Leo Sveikauskas, 1987, "Multicountry, Multifactor Tests of the Factor Abundance Theory," *American Economic Review*, 78, December, 791-809.



- Cecchini, P., 1988, *1992 The European Challenge*, London: Gower.
- Chandler, Alfred D. Jr., 1990, *Scale and Scope*, Cambridge: Harvard University Press.
- Chandler, Alfred d., Jr. 1977, *The Visible Hand: The Managerial Revolution in American Business*, Cambridge, MA: Harvard University Press.
- Cohen, Wesley M. and Steven Klepper, 1991, "Firm Size Versus Diversity in the Achievement of Technological Advance," in Zoltan J. Acs and David B. Audretsch (eds.), *Innovation and Technological Change: An International Comparison*, Ann Arbor: University of Michigan Press, pp. 183-203.
- Cohen, Wesley M. and Steven Klepper, 1992, "The Tradeoff between Firm Size and Diversity in the Pursuit of Technological Progress," *Small Business Economics*, 4(1), 1-14.
- Davis, Steven J., John Haltiwanger, and Scott Schuh, 1996a, "Small Business and Job Creation: Dissecting the Myth and Reassessing the Facts," *Small Business Economics*, 8(4), August, 297-315.
- Davis, Steven J., John Haltiwanger, and Scott Schuh, 1996b, *Job Creation and Destruction*, Cambridge: MIT Press.
- Feller, Irwin, 1997, "Federal and State Government Roles in Science and Technology," *Economic Development Quarterly*, 11(4), 283-296.
- Galbraith, John K., 1956, *American Capitalism*, Boston: Houghton Mifflin.
- Gaston, Robert J., 1989, "The Scale of Informal Capital Markets," *Small Business Economics*, 1(3), 223-230.
- Geroski, Paul A., 1989, "European Industrial Policy and Industrial Policy in Europe," *Oxford Review of Economic Policy*, 5(2), 20-36.
- Giersch, Herbert, Karl-Heinz Paque and Holger Schmieding, 1992, *The Fading Miracle*, Cambridge: Cambridge University Press.
- Graf, J. de V., 1957, *Theoretical Welfare Economics*, Cambridge: Cambridge University Press.
- Griliches, Zvi, 1979, "Issues in Assessing the Contribution of R&D to Productivity Growth," *Bell Journal of Economics*, 10(1), 92-116.
- Griliches, Zvi, 1990, "Patent Statistics as Economic Indicators: A Survey," *Journal of Economic Literature*, 28(4), 1661-1707.
- Griliches, Zvi, 1992, "The Search for R&D Spill-Over," *Scandinavian Journal of Economics*, 94(S), 29-47.

- Grossman, Gene M. and Elhanan Helpman, 1991, *Innovation and Growth in the Global Economy*, Cambridge: MIT Press.
- Grossman, Gene M. and Elhanan Helpman, 1994, "Endogenous Innovation in the Theory of Growth," *Journal of Economic Perspectives*, 8(1), Winter, 23-44.
- Gruber, W.H., D. Mehta, and R. Vernon, 1967, "The R&D Factor in International Trade and International Investment of the United States," *Journal of Political Economy*, 75, February, 20-37.
- Harhoff, Dietmar and Georg Licht (eds.), 1996, "Die Innovationsaktivitaeten kleiner und mittlerer Unternehmen. Ergebnisse des Mannheimer Innovationspanels," Zentrum fuer Europaeische Wirtschaftsforschung, Schriftenreihe des ZEW, 8, Baden-Baden: Nomos.
- Hjalmarsson, Lennart, 1991, "The Scandinavian Model of Industrial Policy," in Magnus Blomstrom and Patricio Meller (eds.), *Diverging Paths: Comparing a Century of Scandinavian and Latin American Economic Development*, Baltimore: Johns Hopkins University Press, pp. 245-265.
- Hughes, Alan, 1997, "Finance for SMEs: A U.K. Perspective," *Small Business Economics*, 9(2), April, 151-166.
- Jorde, Thomas M. and David J. Teece, 1991, "Antitrust Policy and Innovation: Taking Account of Performance Competition and Competitor Cooperation," *Journal of Institutional and Theoretical Economics*, 147, 113-144.
- Justman, M. and M. Teubal, 1986, "Innovation Policy in an Open Economy: A Normative Framework to Strategic and Tactical Issues," *Research Policy*, 15, 121-138.
- Justman, M., 1995, "Infrastructure, Growth and the Two Dimensions of Industrial Policy," *Review of Economic Studies*, 62(1), January, 131-157.
- Keeler, T.E., 1981, "The Revolution in Airline Regulation," in L.W. Weiss and M. Klass (eds.), *Case Studies in Regulation: Revolution and Reform*, Boston, MA: Little, Brown.
- Keesing, Donald B., 1966, "Labor Skills and Comparative Advantage," *American Economic Review*, 56, May, 249-258.
- Keesing, Donald B., 1967, "The Impact of Research and Development on United States Trade," *Journal of Political Economy*, 75, February, 38-48.
- Kleinknecht, Alfred, 1989, "Firm Size and Innovation: Observations in Dutch Manufacturing Industry," *Small Business Economics*, 1(3), 214-222.

- Klodt, Henning, 1990, "Industrial Policy and Repressed Structural Change in West Germany," *Jahrbuecher fuer Nationaloekonomie und Statistik*, 207 (1), February, 25-35.
- Knight, Frank, H., 1921, *Risk, Uncertainty and Profit*, New York: Houghton Mifflin.
- Kolko, G., 1963, *The Triumph of Conservatism*, New York: Macmillan.
- Krugman, Paul E., 1994, *The Age of Diminished Expectations*, Cambridge: MIT Press.
- Krugman, Paul, 1991, *Geography and Trade*, Cambridge: MIT Press.
- Link AI, 1995, *A Generosity of Spirit*, Durham, NC: Duke University Press
- Lowinger, T.C., 1971, "The neo-Factor Proportions Theory of International Trade: An Empirical Investigation," *American Economic Review*, September 1971, 61, 675-681.
- Magee, Stephen P., 1989, "The Competence Theory of Comparative Advantage," in David B. Audretsch and Michael P. Claudon (eds.), *The Internationalization of U.S. Markets*, New York: New York University Press, pp. 11-24
- Markham, J.W., 1965, "Mergers: The Adequacy of the New Section 7," in A. Phillips (ed.), *Perspectives on Antitrust Policy*, Princeton University Press.
- Marshall, Alfred, 1923, *Industry and Trade*, London: Macmillan.
- Marx, Karl, 1912, *Capital*, translated by Ernest Untermann, Vol. 1, Chicago: Kerr.
- Mason, Colin M. and Richard T. Harrison, 1997, "Business Angel Networks and the Development of the Informal Venture Capital Market in the U.K.: Is There Still a Role for the Public Sector?" *Small Business Economics*, 9(2), April, 111-123.
- Moore, T.G., 1976, *Trucking Regulation*, AEI-Hoover Policy Study 18, Palo Alto, CA.
- Mueller, Dennis C., 1989, "Mergers: Causes, Effects and Policies," *International Journal of Industrial Organization*, 7(1), March, 1-178.
- Mueller, Dennis C., 1996, "Lessons from the United States's Antitrust History," *International Journal of Industrial Organization*, 14(4), June, 415-446.
- Mueller, Dennis C., 1986, *Profits in the Long Run*, Cambridge: Cambridge University Press.
- Mueller, Willard F., 1978, *The Celler-Kefauver Act: The First 27 Years, A Staff Report to the Subcommittee on Monopolies and Commercial Law, 95<sup>th</sup> Congress, 2<sup>nd</sup> Session*, December.

- Nelson, Ralph L., 1959, *Merger Movements in American Industry, 1895-1956*, National Bureau of Economic Research, General Studies No. 66, Princeton, New Jersey: Princeton University Press.
- Nelson, Richard R. (ed.), 1993, *National Systems of Innovation*, Oxford: Oxford University Press.
- Nelson, Richard R. and Sidney G. Winter, 1982, *An Evolutionary Theory of Economic Change*, Cambridge: Harvard University Press.
- Nelson, Richard R., 1992, "U.S. Technological Leadership: Where Did it Come from and Where Did it Go?" in F.M. Scherer and M. Perlman (eds.), *Entrepreneurship, Technological Innovation, and Economic Growth: Studies in the Schumpeterian Tradition*, Ann Arbor: University of Michigan Press, pp. 25-50.
- Neumann, Manfred, 1988, "Industrial Organization and Public Policy," *International Journal of Industrial Organization*, 6(2), June, 155-167.
- Neumann, Manfred, 1996, *The Rise and Fall of the Wealth of Nations: Long Waves in Economics and International Politics*, Cheltenham: Edward Elgar.
- Neumann, Manfred, Ingo Boebel and Alfred Haid, 1982, "Innovations and Market Structure in West German Industries," *Managerial and Decision Economics*, 3, 131-139.
- Noren, J.H., 1966, "Soviet Industry Trends in Output, Inputs, and Productivity," in U.S. congress, Joint Economic Committee, *New Directions in the Soviet Union*, part II-A, Washington, D.C.: Government Printing Office, pp. 271-326.
- Okuno-Fujiwara, Masahiro, 1991, "Industrial Policy in Japan: A Political Economy View," in Paul Krugman (ed.), *Trade with Japan: Has the Door Opened Wider?*, Chicago: University of Chicago Press, pp. 271-296.
- Olson, M. 1982, *The Rise and Decline of Nations*, New Haven: Yale University Press.
- Piore, Michael J. and Charles F. Sabel, 1984, *The Second Industrial Divide*, New York: Basic Books.
- Posner, Richard A., 1976, *Antitrust Law: An Economic Perspective*, Chicago, IL: University of Chicago Press.
- Pugel, Thomas A., 1984, "Japan's Industrial Policy: Instruments, Trends, and Effects," *Journal of Comparative Economics*, 8(4), 420-435.
- Reich, Robert B., 1983, *The Next American Frontier*, New York: Times Books.

- Riesman, David, 1950, *The Lonely Crowd: A Study of the Changing American Character*, Studies in National Policy No. 3, New Haven: Yale University Press.
- Romer, Paul M., 1986, "Increasing Returns and Long-Run Growth," *Journal of Political Economy*, 94(5), October, 1002-37.
- Romer, Paul M., 1990, "Endogenous Technological Change," *Journal of Political Economy*, 98, S71-102.
- Romer, Paul M., 1994, "The Origins of Endogenous Growth," *Journal of Economic Perspectives*, 8(1), Winter, 3-22.
- Rosenberg, Nathan, 1992, "Economic Experiments," *Industrial and Corporate Change*, 1(1), 181-204.
- Rothwell, Roy, 1989, "Small Firms, Innovation and Industrial Change," *Small Business Economics*, 1(1), 51-64.
- Saxenian, Annalee, 1990, "Regional Networks and the Resurgence of Silicon Valley," *California Management Review*, 33(1), 89-111.
- Scherer, F.M., 1970, *Industrial Market Structure and Economic Performance*, Chicago: Rand McNally.
- Scherer, F.M., 1977, "The Posnerian Harvest" Separating Wheat from Chaff," *Yale Law Review*, 86, April, 974-1002.
- Scherer, F.M., 1991, "Changing Perspectives on the Firm Size Problem," in Z. Acs and David B. Audretsch (eds.), *Innovation and Technological Change: An International Comparison*, Ann Arbor: University of Michigan Press, pp. 24-38.
- Scherer, F.M., 1992, "Schumpeter and Plausible Capitalism," *Journal of Economic Literature*, 30(3), September, 1416-1433.
- Scherer, F.M., and David Ross, 1990, *Industrial Market Structure and Economic Performance*, third edition, Boston: Houghton Mifflin
- Schumpeter, Joseph A., 1911, *Theorie der wirtschaftlichen Entwicklung, Eine Untersuchung über Unternehmergewinn, Kapital, Kredit, Zins und den Konjunkturzyklus*, Berlin: Duncker und Humblot.
- Schumpeter, Joseph A., 1942, *Capitalism, Socialism and Democracy*, New York: Harper and Row.
- Servan-Schreiber, J.-J., 1968, *The American Challenge*, London: Hamish Hamilton
- Solow, R., 1984, "Industrial Policy," *Journal of Economic Issues*, 18, 241-253.

- Solow, Robert, 1956, "A Contribution to the Theory of Economic Growth," *Quarterly Journal of Economics*, 70, February, 60-94.
- Solow, Robert, 1957, "Technical Change and the Aggregate Production Function," *Review of Economics and Statistics*, August, 39, 312-320.
- Sternberg, Rolf, 1996, "Technology Policies and the Growth of Regions", *Small Business Economics*, 8(2), 75-86.
- Sylos-Labini, Paolo, 1992, "Capitalism, Socialism, and Democracy and Large-Scale Firms," in F.M. Scherer and M. Perlman (eds.), *Entrepreneurship, Technological Innovation, and Economic Growth: Studies in the Schumpeterian Tradition*, Ann Arbor: University of Michigan Press, pp. 55-64.
- Thurow, Lester, 1980, *The Zero Sum Society*, New York: Basic Books.
- Tyson, Laura d'Andrea, Tea Petrin and Halsey Rogers, 1994, "Promoting Entrepreneurship in Eastern Europe," *Small Business Economics*, 6(3), June, 165-184.
- Ueno, H., 1980, "The Conception and Evaluation of Japanese Industrial Policy," in K. Sato (ed.), *Industry and Business in Japan*, White Plains: ME Sharpe.
- United States General Accounting Office, 1982, *Industrial Policy: Case Studies in the Japanese Experience*, Washington, D.C., U.S. Government Printing Office.
- United States General Accounting Office, 1983, *Industrial Policy: Japan's Flexible Approach*, Washington D.C., U.S. Government Printing Office.
- Vernon, Raymond, 1966, "International Investment and International Trade in the Product Life Cycle," *Quarterly Journal of Economics*, 80, May, 190-207.
- Vernon, Raymond, 1996, "International Investment and International Trade in the Product Life Cycle," *Quarterly Journal of Economics*, 80(2), 290-307.
- Wagner, Joachim, 1995, "Firm Size and Job Creation in Germany," *Small Business Economics*, 7(6), December, 469-474.
- Weiss, Leonard W., 1966, "Concentration and Labor Earnings", *American Economic Review*, 56, March, 105-116.
- Wheelwright, Steven C., 1985, "Restoring Competitiveness in U.S. manufacturing," *California Management Review*, 27.
- Whyte, William H., 1960, *The Organization Man*, Hammondsworth, Middlesex: Penguin.
- Williamson, Oliver E., 1985, *The Economic Institutions of Capitalism*, New York: The Free Press.

Williamson, Oliver, 1975, *Markets and Hierarchies: Antitrust Analysis and Implications*,  
New York: The Free Press.