What's New about the New Economy? Sources of Growth in the Managed and Entrepreneurial Economies

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The purpose of this paper is to document the fundamental shift that is taking place in OECD countries. This shift is from the managed economy to the entrepreneurial economy. While politicians and policymakers have made a plea for guidance in the era of entrepreneurship, scholars have been slow to respond. This paper attempts to make a first step identifying and articulating these differences. We do this by contrasting the most fundamental elements of the newly emerging entrepreneurial economy with those of the managed economy. We identify 14 trade-offs confronting these two polar worlds. The common thread throughout these trade-offs is the increased role of new and small enterprises in the entrepreneurial economy. A particular emphasis is placed on changes in economic policy demanded by the entrepreneurial economy vis-à-vis the managed economy.

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1. *Introduction*

Economic growth and employment creation are twin horns of not just the European dilemma but of what looms as the major challenge confronting the West. Over 10% of the workforce in the European Union was unemployed in 1999. Individual countries have responded to the twin horns of the growth–employment dilemma with a broad spectrum of policy approaches. Led by France and Germany, continental European countries have generally pursued policies of maintaining the status quo economic models, while the United

Kingdom and the Netherlands have been bolder at modifying their economic models.

This divergence of policy approaches across countries is new. In the first three postwar decades, the countries of Western Europe and North America pursued economic policies which though not identical had a high degree of similarity. As Galbraith (1956) articulated, something of a convergence had taken place throughout the Western economies in the way that the model of 'managed capitalism' was developing. It seemed that all countries were converging toward economies dominated by a handful of powerful enterprises, constrained only by the countervailing powers of the state and workers.[1] The 1950s and 1960s were an era of high and increasing concentration of economic activity. Perhaps the ascendancy of industrial organization as a field in economics during this period came from the need to address what became known as the *concentration question*. Scholars of industrial organization responded by producing a mass of literature focusing on essentially three issues: (i) How much economic concentration actually exists? (ii) What are the economic welfare implications of an oligopolistic market structure? (iii) Given the evidence that economic concentration is associated with efficiency, what are the public policy implications? Oliver Williamson's classic 1968 article, 'Economies as an Antitrust Defense: The Welfare Trade-offs', became something of a final statement, demonstrating what appeared to be an inevitable trade-off between the gains in productive efficiency that could be obtained through increased concentration and gains in terms of competition, and implicitly democracy, that could be achieved through decentralizing policies.

The fundamental issue of public policy at that time was how to live with this 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. 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 resorted to government ownership of private business. Other countries, such as the Netherlands and Germany, tended to emphasize regulation. Still other countries, such as the Untied States, had a greater emphasis on antitrust. In fact, most countries relied upon elements of

[1] This view was certainly represented in the influential book written by Jean-Jacques Servan-Schreiber in 1968, *The American Challenge*.

all three policy instruments. While the particular instrument 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 policy approach—a managed economy.

Quantitative and qualitative changes in the job market were the first hint of a shifting economic system (Blanchard and Katz, 1997; Siebert, 1997). One manifestation has been a divergence in job creation and reduction of unemployment across countries, between the forerunners that have shifted towards a newly emerging economy, like the Netherlands, Denmark and the United Kingdom, and the laggards still obsessed with perfecting the managed economy, like Germany, or rethinking the managed economy, like France (Nickell, 1997). This newly emerging economy we will term the *entrepreneurial economy*. Why have the policies central to the entrepreneurial economy, such as deregulation, privatization and labor market flexibility, not diffused rapidly to other countries still burdened with unemployment and stagnant growth? As the OECD points out in the 1997 *Employment Outlook*, 'the failure of continental European countries to adopt its recommendations reflects their fear of increased earnings inequality. The question is whether it is possible to deregulate without suffering these malign effects.' The problem is that the alleged benefits from structural change are accompanied only at a perceived cost in terms of important economic goals, such as income equality, the social safety net, a high level of public goods available to all, and a high level of mean wages. To reap the gains from structural change in terms of greater competitiveness, economic growth and ultimately increased employment demands a loss, or at least a perceived loss, of certain other economic policy goals.

In response to the rising unemployment coupled with the stagnant growth of the past decade, this singular policy approach has broken down. The consequences of economic restructuring are enormous and encompass virtually every dimension of economic life. To characterize fundamental differences between the old and emerging systems is a formidable task for both policy makers as well as scholars. While traces of this shift can be found in different lines of research across a broad spectrum of fields within and beyond economics, there are also insightful references in the popular press as well as the political debate addressing the most pressing policy issues of our day. Many of these references are under the rubric of the *New Economy*. In response to their direct accountability to the public, policymakers have been quicker to acknowledge the emergence of changing economic forces.

Although politicians and policymakers have made a plea for guidance in the era of entrepreneurship, scholars have been slower to respond. The purpose of this paper is to make a first step in identifying and articulating these differences and to suggest that a fundamental shift in Europe, along with the other OECD countries, is taking place. This shift is from the managed economy to the entrepreneurial economy. We do this by contrasting the most fundamental elements of the newly emerging entrepreneurial economy with those of the managed economy. Contrasting the managed economy with the entrepreneurial economy is not, however, symmetric. While scholars have accumulated decades of meticulous research documenting, analyzing and explaining the many manifestations of the managed economy, the entrepreneurial economy is sufficiently new as to preclude anything approaching comparable scholarship. Thus, while we are able to stand on the shoulders of giants when describing the managed economy, systematic knowledge about the emerging entrepreneurial economy remains more limited. The aim of this paper is to motivate subsequent research by outlining some of the main differences between the two. We do this by contrasting the most fundamental elements of the newly emerging entrepreneurial economy with those of the managed economy. Fourteen trade-offs confronting these two polar worlds are identified. The common thread throughout these trade-offs is the increased role of new and small enterprises in the entrepreneurial economy.

We speculate that these 14 trade-offs are all manifestations of a shifting source of comparative advantage away from capital and labor towards knowledge-based economic activity. Just as the comparative advantage in economic activity based on capital and labor rendered the managed economy as an appropriate response, the shift to knowledge-based economic activity is the driving force underlying the emergence of the entrepreneurial economy. While the requisite research to validate or refute this conjecture remains to be undertaken, the point of this article is to suggest not only that a systematic and pervasive set of distinct manifestations differentiate the managed economy from the emerging entrepreneurial economy, but also that these differences are profound and fundamental in nature. This article is therefore more descriptive in nature and calls upon analytical contributions from a broad range of other studies to weave together a consistent framework in differentiating the entrepreneurial from the managed economy.

2. *The Trade-offs*

The managed economy, as characterized by Chandler (1977, 1990), thrived for nearly three-quarters of a century. Why has an alternative system, which

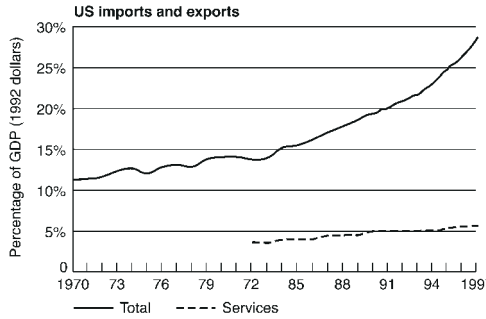

FIGURE 1. US imports and exports. Source: *Economic Report of the President* (February 1998), taken from http://www.neweconomyindex.org/index.html.

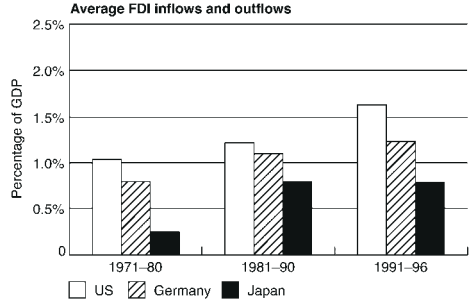

FIGURE 2. Average FDI inflows and outflows. Source: Organization for Economic Co-operation and Development, *Reviews of Foreign Direct Investment—United States* (Paris, 1995), taken from www.neweconomyindex.org/index.html.

we term the entrepreneurial economy, emerged? The answer has to do with globalization. While globalization is a multidimensional phenomenon encompassing a broad spectrum of economic and social dimensions, virtually all measures of trade, foreign direct investment and integration indicate a sharp increase in recent years. For example, Figure 1 shows that trade has become increasingly important over time for the United States. Similarly, Figure 2 shows that foreign direct investment is also gaining in importance.

The emergence of the entrepreneurial economy is a response to two fundamental aspects of globalization. The first is the advent of low-cost but highly skilled competition in Central and Eastern Europe as well as Asia. The second is the telecommunications and microprocessor revolution, which has greatly reduced the cost of shifting standardized economic activity out of high-cost locations, such as Europe, and into lower-cost locations elsewhere in the world.

A consequence of globalization is that the comparative advantage of high-

wage countries is no longer compatible with routinized economic activity, which can be easily transferred to lower-cost regions outside Western Europe. Maintenance of high wages requires knowledge-based economic activity that cannot be costlessly diffused across geographic space. The first group of trade-offs we examine focuses on characterizing the forces underlying the managed and entrepreneurial economies. This group consists of three trade-offs. The first is between localization and globalization. The second trade-off is between change and continuity. Change goes together with knowledge-based activity, and knowledge-based activity results in innovations that are more radical and less incremental. An inherent characteristic of knowledge is high uncertainty, which individuals assess differently. Differences in the evaluation of knowledge result in an increased role of new and small firms. Small firms were viewed negatively in the managed economy because their suboptimal size imposed a less efficient use of resources. The third trade-off of this group compares the view that increased employment requires a reduction in wages with the view in the entrepreneurial economy that higher wages can accompany increased employment.

The second group also consists of three trade-offs, which characterize differences in the underlying environment. Turbulence, diversity and heterogeneity are central to the entrepreneurial economy. By contrast, stability, continuity and homogeneity were the cornerstones of the managed economy. These differences are examined in trade-offs 4–6.

There are four trade-offs in the fourth group, which focuses on how firms function in the entrepreneurial and managed economies. Trade-off 7 examines motivation versus control. The boundary between the firm and the industry is the subject of trade-off 8—market exchange versus firm transaction. The interface between firms is the focus of trade-off 9, where competition and co-operation are viewed as complements or substitutes. The tenth trade-offs focuses on the roles of flexibility and scale economies.

The final group consists of four trade-offs involving government policy. They cover the goal of policy (stimulation versus regulation), the target of policy (inputs versus outputs), the locus of policy (local versus national) and financing policy.

2.1 Localization versus Globalization

The meaning of geographic space differs between entrepreneurial and managed economies. In the managed economy, the standardization of products and production reduces the importance of regional-specific characteristics and idiosyncrasies. This is because of the difference in the most

important factors of production between the managed and entrepreneurial economies. As represented by the neoclassical production function, production in the managed economy results from the inputs of land, labor and capital (Romer, 1992). While these traditional inputs still play a role in the entrepreneurial economy, knowledge has emerged as the most important factor of production. A recent literature from the new growth theory argues that knowledge differs inherently from the traditional factors of production in that it cannot be costlessly transferred across geographic space (Krugman, 1991a,b; Lucas, 1993). This is why under the entrepreneurial economy geography plays a more important role in that knowledge tends to be developed in the contexts of localized production networks embedded in innovative clusters.

In rediscovering the importance of economic geography, Krugman (1991a, p. 5) asks, 'What is the most striking feature of the geography of economic activity? The short answer is surely concentration . . . production is remarkably concentrated in space.' Perhaps in response to Krugman's concern, a literature in economics has recently emerged which focuses on the implications of the spatial concentration of economic activity for economic growth. Theoretical models posited by Romer (1990), Lucas (1993) and Krugman (1991a,b) link increasing returns to scale yielded by externalities within a geographically bounded region to higher rates of growth. The empirical evidence clearly suggests that R&D and other sources of knowledge not only generate externalities, but also that such knowledge spillovers tend to be geographically bounded within the region where the new economic knowledge was created (Jaffe, 1989; Jaffe *et al.*, 1993; Audretsch and Feldman, 1996; Audretsch and Stephan, 1996). That is, new economic knowledge may spill over, but the geographic extent of such knowledge spillovers is limited.[2]

As Figure 3 shows, internet use has exploded in the last decade. The importance of location and geographic proximity in a world increasingly dom-

[2] An important finding of Jaffe (1989) and Audretsch and Feldman (1996) is that investment in R&D by private corporations and universities spills over for economic exploitation by third-party firms. In these studies the knowledge production function was modified where the innovative activity within a geographical unit of observation—a state—was related to the private corporate expenditures on R&D within that state as well as the research expenditures undertaken at universities. Not only was innovative activity found to increase in the presence of high private corporate expenditures on R&D, but also as a result of research expenditures undertaken by universities within the geographic area. In order to explicitly identify the recipients of R&D spillovers, Acs, Audretsch and Feldman (1994) estimated separate knowledge production functions for large and small firms. Their results suggested that the innovative output of all firms rises along with an increase in the amount of R&D inputs, in both private corporations and university laboratories. However, R&D expenditures made by private companies play a particularly important role in providing inputs to the innovative activity of large firms; and expenditures on research made by universities serve as an especially key input for generating innovative activity in small enterprises.

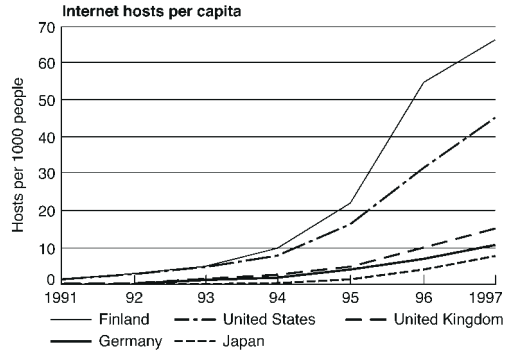

FIGURE 3. Internet hosts per capita.

inated by email, fax machines and electronic communications superhighways may seem surprising and even paradoxical at first glance. After all, the new telecommunications technologies have triggered a virtual spatial revolution in terms of the geography of production.

The resolution of this paradox lies in the distinction between knowledge and information. While the marginal cost of transmitting *information* may be invariant to distance, presumably the marginal cost of transmitting *knowledge*, and especially *tacit knowledge*, rises with distance. Von Hipple (1994) demonstrates that high context, uncertain knowledge, or what he terms as *sticky knowledge*, is best transmitted via face-to-face interaction and through frequent contact. Proximity matters in transmitting knowledge because as Arrow (1962) pointed out some three decades ago, tacit knowledge is inherently non-rival in nature, and knowledge developed for any particular application can easily spill over and be applied for different purposes. Similarly, Griliches (1992, p. 29) has defined knowledge spillovers as 'working on similar things and hence benefiting much from each other's research.' As Glaeser *et al.* (1992) have observed, 'intellectual breakthroughs must cross hallways and streets more easily than oceans and continents'. Stephan (1996) explains the role that working together in close proximity plays in generating new breakthroughs in science.[3]

The dichotomy between knowledge and information does not contradict globalization. However, globalization has not had symmetric impacts on knowledge and information. On the one hand, globalization has made it

[3] The dichotomy between information and tacit knowledge does not mirror the more traditional dichotomy between high and low technology industries. Just as there are aspects of high technology industries that are well defined and standardized and can therefore be outsourced, there are also elements of low technology industries that are not well defined and cannot be outsourced. For example, certain types of software programming is outsourced to India and Eastern Europe, while the genesis for ideas in entertainment clusters in just several locations.

possible to transfer information costlessly across geographic space. On the other hand, the geographic dimension of knowledge remains a local phenomenon, largely unchanged by globalization. Thus, globalization has exerted a powerful shift on the relative prices of obtaining information and knowledge. While the relative cost of obtaining information has been drastically reduced, the cost of obtaining knowledge remains largely unchanged. This change in the relative prices of knowledge and information has triggered a shift in comparative advantage.

Under the managed economy, the traditional factors of land, labor and capital are predominant as sources of comparative advantage. This was clearly the case in mass production where abundance of capital determined the comparative advantage (Chandler, 1977). Local characteristics and regional idiosyncrasies are irrelevant as a knowledge source and therefore as a source of competitive advantage. In the managed economy, geography provides a platform to combine mobile capital with (immobile) lower-cost labor (Kindleberger and Audretsch, 1983). In the entrepreneurial economy the comparative advantage is based on innovative activity. An important source of this innovative activity is knowledge spillovers that cannot be easily diffused across geographic space. Local characteristics and regional idiosyncrasies provide a rich source of new knowledge in the entrepreneurial economy. The so-called *death of distance* resulting from globalization has shifted the comparative advantage of high-cost locations towards economic activity that cannot be costlessly diffused across geographic space. The creation and spillover of tacit knowledge is a localized phenomenon. Thus, in the entrepreneurial economy local proximity and regions have emerged as an important locus of economic activity.

2.2 Change versus Continuity

Cohen and Klepper (1992) identify an inherent trade-off between change on the one hand and continuity on the other. While the managed economy depended upon continuity (Chandler, 1977), the entrepreneurial economy provokes and thrives on change. Cohen and Klepper's (1992) theory extends the work of Richard Nelson (1981) about the importance of competition and diversity for technological change. Seen through the lens of evolutionary economics (Nelson and Winter, 1982) there are two key dimensions involved in the process of technological change: diversity and selection. The technological competence of each firm results in a particular technological trajectory. Innovative activity is generally within the boundaries established by the firm's core competence and its technological trajectory. Such innovative

activity within the technological paradigm established by the firm's core competence provides the basis of continuity in the managed economy.

As Cohen and Klepper (1992) point out, large firms have a greater incentive to invest in R&D because they are better able to appropriate the returns through greater output and sales. At the same time they do not have a large incentive to try to extend innovative activity beyond the boundaries imposed by their technological trajectories. According to Cohen and Klepper (1992, p. 2),

> Dividing up industry output over a greater number of small firms increases the chances that any given approach to innovation will be pursued, thereby increasing the diversity of technological efforts in the industry. While increasing the number of firms does not necessarily benefit individual firms in the industry, it promotes technical advance and, hence, benefits society by increasing the number of productive approaches to innovation that are collectively pursued in the industry. From this perspective, the source of the social advantage associated with small firm size is not smallness per se but the greater number of firms that small size implies given some industry demand.

Thus, in the entrepreneurial economy, decentralized decision-making in an industrial structure comprised of smaller firms leads to a greater diversity of approaches. This diversity, in turn, generates greater opportunities for breaking out of the boundaries imposed by the lock-in along technological trajectories and ultimately to hit it big.

Concentrating knowledge resources in just several firms in the managed economy results in a concentration of innovative activity within just several technological trajectories. By contrast, unleashing knowledge by letting loose a horde of independent agents—deconcentration—in the entrepreneurial economy, results in a greater diversity of approaches across a broad range of technological trajectories. Which is more efficient? If the degree of uncertainty is relatively low, then concentrating knowledge results may result in greater technological change. But as the degree of uncertainty increases, a diversity of approaches, represented by a multiplicity of technological trajectories, becomes more important.

Innovation is present under both change and continuity. However, the locus of innovative activity differs considerably between the managed and entrepreneurial economies. This difference is shaped by a distinction between incremental and radical innovations. Innovations can be considered to be incremental when that they are compatible with the core competence and

technological trajectory of the firm (Teece *et al.*, 1994).[4] The implementation of such incremental innovations does not require significant change in the firm or its personnel. By contrast, a radical innovation can be defined as extending beyond the boundaries of the core competence and technological trajectory of the firm. Both theoretical reasons and empirical evidence support the notion that firms are characterized by technological lock-in. Theoretically, implementation of a radical innovation would require significant changes in the firm and its personnel. As Hannan and Freeman (1989) conclude, 'We assume that individual organizations are characterized by relative inertia in structure.' Empirically, a rich set of case studies provides compelling evidence that incumbent firms tend to suffer from technological lock-in (Henderson and Clark, 1990; Christenson, 2000). The managed economy was designed to absorb change within a given technological paradigm, and hence the typical firm excelled at incremental innovation. By contrast, in the entrepreneurial economy, the capacity to break out of the technological lock-in imposed by existing paradigms is enhanced. Incumbent firms may still be subject to technological lock-in in the entrepreneurial economy, just as they were under the managed economy. However, the ability for individuals and groups of individuals to break out of the existing technological trajectories by starting a new firm is a fundamental characteristic differentiating the entrepreneurial from the managed economy. The main mechanism for breaking out of a locked-in technology is the ability of economic agents to start new firms. The firm's technological trajectory may be locked-in, but new technological trajectories are started as new firms are created.

The industry lifecycle theory introduced by Vernon (1966) is typically considered to link trade and foreign direct investment to the stage of the lifecycle. There do not appear to be direct implications for the relevance of radical versus incremental innovations. But a more thoughtful examination of the framework of the industry lifecycle suggests that the relative importance of radical versus incremental innovations is shaped by the industry lifecycle.

There have been various versions of what actually constitutes the industry lifecycle. For example, Williamson (1975, pp. 215–216) has depicted the industry lifecycle as,

> Three stages in an industry's development are commonly recognized: an early exploratory stage, an intermediate development stage, and a mature stage. The first or early formative stage involves the supply of a new product of relatively primitive design, manufactured on comparatively

[4] Archibugi and Pianta (1992) show that what holds for firms also holds for countries.

> unspecialized machinery, and marketed through a variety of exploratory techniques. Volume is typically low. A high degree of uncertainty characterizes business experience at this stage. The second stage is the intermediate development state in which manufacturing techniques are more refined and market definition is sharpened, output grows rapidly in response to newly recognized applications and unsatisfied market demands. A high but somewhat lesser degree of uncertainty characterizes market outcomes at this stage. The third stage is that of a mature industry. Management, manufacturing, and marketing techniques all reach a relatively advanced degree of refinement. Markets may continue to grow, but do so at a more regular and predictable rate-established connections, with customers and suppliers (including capital market access) all operate to buffer changes and thereby to limit large shifts in market shares. Significant innovations tend to be fewer and are mainly of an improvement variety.

While not explicitly stated by Vernon (1966) or Williamson (1975), the role of R&D does not stay constant over the industry lifecycle. As Klepper (1996) shows, in the early stages of the lifecycle, R&D tends to be highly productive, so that there are increasing returns to R&D. In addition, the costs of radical innovation tend to be relatively low while the cost of incremental innovation and imitation tend to be relatively low. Because innovation in newly emerging industries tends to be more radical and less incremental, it is more costly to diffuse across geographic space for economic application in lower-cost locations.

By contrast, as an industry evolves over the lifecycle, the cost of radical innovation tends to increase relative to the cost of incremental innovation and imitation. Strong diminishing returns to radical innovative activity set in. This is not the case for incremental innovation and especially imitation. An implication is that it requires an increasing amount of R&D effort to generate a given amount of innovative activity as an industry matures over the lifecycle. At the same time, it requires a decreasing amount of R&D expenditure to transfer new technology to lower cost locations, because innovation activity tends to become less radical and more incremental (Dosi, 1982, 1988; Nelson, 1990, 1995).

This means that information generated by R&D in mature industries can be transferred to lower-cost locations for economic commercialization. By contrast, the knowledge resulting from R&D in newly emerging industries cannot be easily transferred to lower-cost locations for economic commercialization. The reason for the asymmetry between the ability to transfer the product of R&D lies in the inherent distinction between information and

knowledge described above. Since R&D generates tacit knowledge in the earlier stages of the lifecycle, geographic proximity plays a more important role. Thus, under the managed economy incremental innovative activity along with diffusion played a more important role. This type of innovative activity, while often requiring large R&D investment, generated incremental changes in products along the existing technological trajectories. In the entrepreneurial economy, the comparative advantage of the high-cost location demands innovative activity earlier in the lifecycle. Early stage innovative activity consists of radical innovation, which is more involved in creating and developing new technological trajectories rather than following existing technological trajectories (Agarwal and Audretsch, 2001).

2.3 Jobs and High Wages versus Jobs or High Wages

One of the most striking policy dilemmas in the managed economy was that unemployment could be reduced only at the cost of lower wages. In the entrepreneurial economy the choice is less ambiguous. High employment can be combined with high wages, just as low wages do not necessarily imply high employment.

The policy dilemma between employment creation and wage levels was the response to the wave of corporate downsizing, which has left virtually no OECD country untouched. The US Labor Department recently reported that as a result of corporate downsizing more than 40 million jobs have disappeared in the United States since 1979. This includes over 20 million blue-collar jobs and somewhat fewer than 20 million white-collar jobs. Between 1980 and 1993, the 500 largest US manufacturing corporations cut nearly 5 million jobs, or one-quarter of their workforce (Audretsch, 1995). The rate of corporate downsizing has apparently increased over time. During most of the 1980s, about one in 25 workers lost a job. In the 1990s this has risen to one in 20 workers. Such downsizing has not been unique to the United States but has become increasingly rampant throughout Europe.

If corporate downsizing has been rampant throughout OECD countries, why is there such a large variance in unemployment rates? For example, unemployment in the United States, United Kingdom and the Netherlands has actually been falling. How can these seemingly incompatible phenomena be reconciled? Because the more entrepreneurial economies have been more successful at creating new jobs to compensate for jobs lost to corporate downsizing. It is small firms in general, and new firm start-ups in particular, that have been the locomotive of employment creation.[5] For example, Audretsch (1995) found that 1.3 million new jobs in manufacturing were in

TABLE 1. Entrepreneurship Rate in OECD Countries

	Level			Growth	
	1974	1986	1998	1986–74	1998–86
Austria	0.081	0.066	0.080	–0.015	0.013
Belgium	0.100	0.106	0.119	0.005	0.013
Denmark	0.081	0.063	0.064	–0.018	0.001
Finland	0.062	0.066	0.082	0.004	0.015
France	0.109	0.098	0.085	–0.011	–0.012
Germany (West)	0.073	0.069	0.085	–0.004	0.016
Greece	0.173	0.182	0.186*	0.009	0.003
Ireland	0.073	0.078	0.112	0.004	0.034
Italy	0.144	0.167	0.182	0.023	0.015
Luxembourg	0.100	0.078	0.059*	–0.022	–0.019
The Netherlands	0.097	0.082	0.104	–0.015	0.022
Portugal	0.110	0.108	0.152*	–0.002	0.044
Spain	0.116	0.115	0.130	–0.001	0.015
Sweden	0.071	0.066	0.082	–0.005	0.016
UK	0.077	0.089	0.109	0.012	0.020
Iceland	0.102	0.099	0.132	–0.004	0.033
Norway	0.092	0.084	0.071	–0.008	–0.014
Switzerland	0.065	0.070	0.091	0.005	0.021
USA	0.082	0.103	0.103	0.021	0.000
Japan	0.127	0.125	0.100	–0.002	–0.024
Canada	0.075	0.100	0.141	0.025	0.041
Australia	0.137	0.165	0.155	0.028	–0.011
New Zealand	0.098	0.110	0.142	0.012	0.032
Average	0.098	0.100	0.111		

The source of the data are OECD figures, adapted by EIM to improve upon international comparability. *Provisional. Agriculture is excluded. Germany is West Germany for 1974 and 1986. The total numbers of business owners for all countries in 1974, 1986 and 1998 are 30 337, 38 446 and 44 927 respectively (in thousands). The data set is referred to as COMPENDIA 2000.1. For further information contact André van Stel at EIM (ast@eim.nl).

fact created by small firms between 1976 and 1986, while the number of large manufacturing jobs actually decreased by 100 000. Subsequently, between 1987 and 1992, small companies (with fewer than 500) employees created all of the 5.8 million new jobs in the United States. Over that same period, large companies recorded a net loss of 2.3 million jobs

Konings (1995) found that for the United Kingdom there is a negative

[5] The literature on employment generation and firm size can be found in Davis *et al.* (1996a,b) and Carree and Klomp (1996).

relationship between gross job creation and plant size but a positive one between gross job destruction and plant size. Robson and Gallagher (1994) show that about one-third of all new employment in the United Kingdom between 1971 and 1981 was in firms with fewer than 20 employees. In the 1980s nearly one-half of all jobs were created in such firms (although they accounted for about one-fifth of total employment in 1985). And between 1987 and 1991 large firms in the United Kingdom, like their counterparts in the United States, were net job shedders. Small firms contributed all of the new employment. Hughes (1993) provides evidence suggesting that this was in part due to downsizing of the largest firms in the economy, and in part due to an actual expansion of economic activity contributed by small firms. Baldwin and Picot (1995) have found virtually identical results for Canada.

Table 1 shows that there has been considerable disparity among OECD countries in business ownership rates both across countries and over time. The magnitude of this shift and speed of adjustment varies considerably across countries. Econometric evidence undertaken by Audretsch *et al.* (2001) suggests that those countries that have shifted industry structure towards smaller firms in a more rapid fashion have been rewarded by higher growth rates (see also Thurik, 1996; Carree and Thurik, 1998, 1999; Audretsch and Thurik, 2000).

While systematic empirical evidence has been gathered across a broad range of countries documenting that small firms generate most of the new jobs, similar studies also provide compelling evidence that small firms are also a large source of job destruction. Taken together, these studies suggest that the industrial structure has become more turbulent (Caves, 1998).

In the managed economy, the job creation contributed by small firms was associated with lower wages. There is a large body of consistent empirical evidence linking the size of a firm to wages. Probably the most cited study is that of Brown *et al.* (1990, pp. 88–89), who conclude that,

> Workers in large firms earn higher wages, and this fact cannot be explained completely by differences in labor quality, industry, working conditions, or union status. Workers in large firms also enjoy better benefits and greater job security than their counterparts in small firms. When these factors are added together, it appears that workers in large firms do have a superior employment package.

This apparent trade-off between wages and employment is the result of static, cross-section studies taken at a single point in time. A different picture emerges when a dynamic analysis is introduced. This dynamic analysis

suggests that, in knowledge-based industries, people start firms to pursue new but uncertain ideas. The only way they can discover if these new ideas are viable is through the trial-and-error experience provided by the market (Jovanovic, 1982; Ericson and Pakes, 1995; Pakes and Ericson, 1998). They subsequently learn, or discover, through experience, whether or not the idea is viable. If it is viable, the firm will survive and grow. If it is not viable, the firm stagnates and ultimately exits. An important line of research, spanning a broad spectrum of time periods and countries, supports this dynamic view of industries (Geroski, 1995; Caves, 1998). Start-up activity is high in almost every OECD country. Audretsch (1995) has shown that it is greater in industries where there is a higher degree of uncertainty than in industries where there is less uncertainty. In addition, there is systematic evidence that negative relationships exist between firm age and growth, and firm size and growth, as well as positive relationships between firm size and the likelihood of survival, and firm age and the likelihood of survival (Geroski, 1995). This evidence supports the dynamic view of industries that people start firms to experiment with new ideas. Most of these experiments fail, but some succeed, resulting in lower survival rates but high growth rates of the new entrants.

Recent research based on longitudinal data sets, shows that the wages and productivity of new firms in knowledge-based industries increase as the firm ages (Baldwin, 1995; Audretsch *et al.*, 2001). This implies that, as new firms mature, the small low wage firm of today becomes the high wage firm of tomorrow. Similarly, the small low productivity firm of today becomes the high productivity firm of tomorrow (Baily *et al.*, 1996). New and small firms are in motion. Through growth, new firms generate not just greater employment but also higher wages. The growth of new firms ensures that the greater employment does not come at a cost of lower wages, but rather the opposite—higher wages. Thus, while small firms generated employment at a cost of lower wages in the managed economy, in the entrepreneurial economy small firms create both more jobs and higher wages.

2.4 Turbulence versus Stability

The managed economy of the postwar period was characterized by remarkable stability. This stability was characterized by product homogeneity and durability of demand, resulting in a constant population of firms, and a low turnover rate of both jobs and workers. This stability was conducive to mass production. Just as Taylorism provided a managerial mechanism for ensuring the stability and reliability of workers in the production process,

competition focused on the dimension of prices but not necessarily product differentiation (Chandler, 1977).

In the 1950s and 1960s it took two decades to replace one-third of the Fortune 500. In the 1970s it took one decade. And in the 1980s one-third of the Fortune 500 firms were replaced within just five years. Perhaps even more impressive than the handful of new enterprises that grow to penetrate the Fortune 500 are the armies of start-ups that come into existence each year—and typically disappear into oblivion within a few years. In the 1990s around 1.3 million new companies were started each year in the United States (Audretsch, 1995).

Why is the entrepreneurial economy characterized by less stability and more turbulence? The answer has to do with the sources and commercialization of new ideas. As Nelson and Winter (1982) emphasize, the role of diversity and selection has been at the heart of generating change. The process of creating diverse ideas and selecting across these diverse ideas is important in both the managed and entrepreneurial economies. However, what differs is the management and organization of the process by which diversity is created as well as the selection mechanism. In the managed economy, research activities are organized and scheduled in departments devoted towards novel products and services. The management of change fitted into what Nelson and Winter (1982) call the *routines* of a firm. According to Schumpeter (1942, p. 132), 'Innovation itself is being reduced to routine. Technological progress is increasingly becoming the business of teams of trained specialists who turn out what is required and make it work in predictable ways.' The ability of the existing corporations to manage the process of change pre-empted any opportunities for entrepreneurs to start new firms. This meant that relatively few firms were started and few firms failed, resulting in a remarkably stable industrial structure. Chandler (1990) examined the largest 200 firms in the United States, Britain and Germany over the first half of this century and found that they maintained a remarkably stable position. Teece (1993, p. 214) interprets these findings: 'Chandler's data on rankings of the largest industrial firms (for 1917, 1930, 1948 for Great Britain; 1913, 1928, 1953 for Germany) indicate considerable stability in rankings—at least as compared to what economic theory would predict. The firms that were leaders (as measured by asset size) in their industrial groupings often remained there over long periods.' Similarly, the share of total US manufacturing assets accounted for by the largest 100 corporations increased from about 36% in 1924, to 39% after the Second World War to over 50% by the end of the 1960s. This development caused Scherer (1970, p. 44) to state that, 'Despite the (statistical) uncertainties, one thing is clear. The increasing domestic dominance of

the 100 largest manufacturing firms since 1947 is not a statistical illusion.' Similarly, Mueller (1989) has shown that the profits of the largest corporations tended to persist in the long run during the postwar period.

In the entrepreneurial economy, the process of generating new ideas, both within and outside of R&D laboratories, creates a diversity of opinions about the value of these new ideas. Differences in the evaluation of new ideas leads individual agents to pursue their commercialization external to the established firm in the form of a new independent venture. The diversity of new ideas and experiments with their commercialization manifests itself externally as well as internal to incumbent firms. The selection between viable and non-viable ideas is then the result of the market process and not restricted to internal decisions imposed by decision-making hierarchies. The drive to appropriate the expected value of knowledge embodied in individual economic agents results in commercialization of ideas in the form of new firms. But not all of these start-ups are successful. A large body of empirical studies shows (Geroski, 1994) that (i) start-up rates are greater in innovative industries than in non-innovative industries, and (ii) the likelihood of survival is lower in innovative industries (for a study of the services see Audretsch *et al.*, 1999). Audretsch (1995) finds that one-third of all US manufacturing firms are less than six years old. However, these new start-ups account for only 5% of total manufacturing employment.

Taken together, this evidence provides a view of the entrepreneurial economy as being characterized by a tremendous degree of turbulence. 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 large enterprises.

It is not just enterprises that are more turbulent in the entrepreneurial economy, but also both jobs and the commitments between firms and workers. Davis *et al.* (1996a, b) document a marked increase in the degree of worker turnover in the United States over a long period of time. At the same time, labor contracts have become more targeted towards specific tasks, typically for a limited period time, whereas in the managed economy labor contracts tended to be general for an indefinite time period. The new legal forms of employment contracts and practices—part-time workers, flex-workers, temporary workers, freelance workers, contract workers, consultants, etc.—represent an injection of entrepreneurial forces into the labor market (Eberts and Stone, 1992; Addison and Welfens, 1998). For example, Paque (1998) shows that the share of total employment accounted for by part-time workers has increased between 1973 and 1994 from 3.8% to 12.8%

in Belgium, from 4.9% to 14.9% in France, from 10.1% to 15.1% in Germany, from 16.0% to 23.8% in the United Kingdom, and between 1983 and 1994 from 21.4% to 35.0% in the Netherlands. The greater degree of uncertainty and turnover experienced by workers in the entrepreneurial economy mirrors the greater turbulence experienced by firms. Replacing long-term fixed contracts with new flexible forms of work contracts provides the essential vehicle propelling the transition from the managed to the entrepreneurial economy.

2.5 Diversity versus Specialization

There has been a series of theoretical arguments suggesting that the degree of diversity versus specialization may account for differences in rates of growth and technological change. There are two dimensions to this debate: the firm and the industry. More recently, it has been extended to geographic units, such as nations and regions. On the one hand, specialization of industry activities is associated with lower transactions costs and therefore greater (static) efficiency (the decrease in transactions costs results in a decrease in production costs). On the other hand, a diversity of activities is argued to facilitate the exchange of new ideas and therefore greater innovative activity and (dynamic) efficiency.

One view, which Glaeser *et al.* (1992) attribute to the *Marshall–Arrow–Romer* externality, suggests that an increased specialization of a particular industry facilitates knowledge spillovers across firms because all workers are engaged in identical activity. This model formalizes the insight that the concentration of an industry within a certain set of narrow economic activities promotes knowledge spillovers between firms and therefore facilitates innovative activity. An important assumption of the model is that knowledge externalities with respect to firms exist, but only for firms within the same activities.

By contrast, restricting knowledge externalities to occur only within the specialized industry may ignore an important source of new economic knowledge: inter-industry knowledge spillovers. Jacobs (1969) argues that the most important source of knowledge spillovers are external to the industry in which the firm operates and that cities are the source of considerable innovation because the diversity of knowledge sources is greatest in cities. This same view about the role of knowledge spillovers in cities is the basis of Lucas (1993). According to Jacobs, it is the exchange of complementary knowledge across diverse firms and economic agents that yields a greater return on new economic knowledge. She develops a theory that emphasizes

that the variety of industries within a geographic region promotes knowledge externalities and ultimately innovative activity and economic growth.[6]

Recent studies have provided evidence testing for the impact of diversity versus specialization on the performance of regions, measured in terms of growth (Glaeser *et al.*, 1992) and in terms of innovative activity (Feldman and Audretsch, 1999). These studies provide systematic empirical support for the thesis that diversity is more conducive to knowledge spillovers and ultimately innovative activity and subsequent growth than is specialization.[7]

Because spillovers are an important source of knowledge-generating innovative activity, diversity is a prerequisite of the entrepreneurial economy. Sacrificing lower transaction costs for greater opportunities for knowledge spillovers is preferable. In the managed economy, there is less to be gained from the spillover of knowledge. The higher transaction costs associated with diversity yield little in terms of increased innovative activity, making specialization preferable in the managed economy.

2.6 Heterogeneity versus Homogeneity

A trade-off exists between the degree of heterogeneity and homogeneity within the population. In contrast to the trade-off between diversity and specialization, which focuses on firms, the trade-off involving population refers to individuals, which are the basis for decision-making within firms and as consumers. There are two dimensions shaping the degree of homogeneity/heterogeneity. The first refers to the genetic make-up of individuals and their personal experiences (Nooteboom, 1994). The second dimension refers to the information set to which they are exposed. The managed economy is based on homogeneity; the entrepreneurial economy on heterogeneity. According to Nooteboom (1994, p. 330), 'The sources that produce diversity within the scope allowed for it, lie in the variance of backgrounds, motives and goals of entrepreneurship.'

To the extent that individuals in the population are identical, the costs of communication and transactions are minimized (Olson, 1982). Lower costs of transaction in communication result in (static) efficiency gains and facilitate

[6] The first important test of the specialisation versus diversity theories to date has focused not on the gains in terms of innovative activity, but rather in terms of employment growth. Glaeser *et al.* (1992) employ a data set on the growth of large industries in 170 cities between 1956 and 1987 in order to identify the relative importance of the degree of regional specialisation, diversity and local competition play in influencing industry growth rates. The authors find evidence that contradicts the Marshall–Arrow–Romer model but is consistent with the theories of Jacobs. However, their study provided no direct evidence as to whether diversity is more important than specialisation in generating innovation.

[7] Feldman and Audretsch (1999) provide systematic evidence that the gains from diversity hold for both the spatial and firm units of observation.

a higher probability of knowledge spilling over across individuals within the population. However, new ideas are less likely to emerge from communication across individuals in a perfectly homogeneous population because these individuals tend to be identical. This means that individuals in homogeneous populations tend to have access to the same information sets and to evaluate any information set in a similar fashion. Thus, a homogeneous population results in a higher probability of communications but those communications have a lower impact because there are fewer new ideas to spill over. A world of homogeneous economic agents promotes diffusion but not innovation.

In a heterogeneous population each individual has a unique genetic and experience profile, and has access to a unique information set (Olson, 1982). The unique genetic and experience profiles would result in a different evaluation across individuals even for a given set of information. However, a heterogeneous population is also characterized by differential access to information. This means that the costs of communications across individuals in a heterogeneous population tend to be difficult and costly, resulting in higher transaction costs and lower levels of efficiency than in a homogeneous population. At that same time, new ideas are more likely to emerge from communication in a heterogeneous than in a homogeneous world. An implication is that the likelihood of communication in a heterogeneous population is lower but such communication is more prone to produce novelty and innovation. It is differences not similarities that generate knowledge spillover. As W. M. Cohen and F. Malerba (unpublished data) argue, the 'tendency to variation is a chief cause of progress'.

The trade-off between diversity versus specialization focuses on the population of firms and industries. The trade-off discussed in this section is analogous and involves the population of people. The lower transactions costs resulting from a homogeneous population in the managed economy are not associated with a high opportunity cost, because knowledge spillovers are relatively unimportant in generating innovative activity. However, knowledge spillovers are a driving force in the entrepreneurial economy, which more than offset the higher transactions costs associated with a heterogeneous population. The relative degree of homogeneity or heterogeneity can be influenced by policies, such as those promoting immigration, mobility and education.[8]

2.7 Motivation versus Control

If the application of British inventions in the 1800s had served as the catalyst

[8] It may be that the appropriate role of education was to foster homogeneity in the managed economy, but heterogeneity in the entrepreneurial economy (Audretsch *et al.*, forthcoming).

for US 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 structure of the modern corporation, the new managerialism excelled at amassing large quantities of raw materials, labor and capital inputs, and at applying particular manufacturing processes, thereby achieving a very specific use of these resources. The essence of the managerialism was *command and control of labor 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 under the mass-production regime became less important. What mattered most under Taylorism was the consistency and reliability of each precise cog; what mattered least was the decision-making capability of each unit. Thus, the labor input in the production process was reduced to routine (Chandler, 1990).

However, as the comparative advantage of the advanced industrialized countries in Europe and North America become increasingly based on new knowledge, the command and control approach to labor becomes less effective. What matters less is requiring an established set of activities from knowledge workers and what matters more is motivating these workers to facilitate the discovery and implementation of new ideas. The type of work environment fostering creativity is radically different from one simply harnessing the brute labor input of workers. A central feature of work is dealing with uncertainty. As uncertainty replaces predictability as the main characteristic of the work environment, workers who can deal with uncertain situations are more valuable in the entrepreneurial economy. This contrast between the new entrepreneurial and managed economies is reflected by the explosion of titles such as *Managing Chaos*, *Re-engineering*, *Management without Hierarchy*, and *De-Layering* in the popular management literature. Thus, in the entrepreneurial economy motivating employees to participate in the

creation and commercialization of new ideas matters more than in simply controlling and regulating their behavior.

2.8 Market Exchange versus Firm Transaction

Dating back at least to Coase (1937), and more recently advanced by Williamson (1975), an analytical distinction has been made between exchange via the market and intra-firm transactions. Coase (1937) and later Williamson (1975) argued that the size of an enterprise will be determined by answering what Coase (1937, p. 30) articulated as, 'The question always is, will it pay to bring an extra exchange transaction under the organizing authority?' Both Coase (1937) and Williamson (1975) emphasize that uncertainty and imperfect information increase the costs of intra-firm transactions. As Knight (1921) argued, low uncertainty combined with transparency and predictability of information make intra-firm transactions efficient relative to market exchange. However, in an era where uncertainty is high and information is imperfect, market exchange tends to be more efficient than intra-firm transactions. In the managed economy, which was dominated by a high degree of certainty and predictability of information, transactions within firms tended to be more efficient than market exchange. This is consistent with the well-documented increase in both vertical integration and conglomeration during the post-war period (Chandler, 1977). In the entrepreneurial economy, both of these trends have been reversed (Carlsson, 1989). As Carlsson and Taymaz (1994) show, there has been a decrease in both mean firm size as well as the extent of vertical integration and conglomeration since the mid-1970s.

Coase was awarded a Nobel Prize for explaining why a firm should exist. But why should more than one firm exist in an industry?[9] One answer is provided by the traditional economics literature focusing on industrial organization in the managed economy. An excess level of profitability induces entry into the industry. And this is why the entry of new firms is interesting and important in the managed economy—because the new firms provide an equilibrating function in the market, in that the levels of price and profit are restored to the competitive levels. In the traditional theory, outputs and inputs in an industry are assumed to be homogenous. That is, the entry of new firms in the managed economy is about business as usual—it is just that

[9] Coase (1937, p. 23) himself asked, 'A pertinent question to ask would appear to be (quite apart from the monopoly considerations raised by Professor Knight), why, if by organising one can eliminate certain costs and in fact reduce the cost of production, are there any market transactions at all? Why is not all production carried on by one big firm?'

with the new entrant there is more of it. Geroski (1991a, p. 65) reflects the role of entry in the managed economy by asserting,

> If we think of entry as an error-correction mechanism which is attracted by and serves to bid away excess profits, it is natural to suppose that entry will occur whenever profits differ from their long-run levels. Given this maintained hypothesis, observations of actual entry rates and current (or expected post-entry) profits can be used to make inferences about the unobservable of interest—long-run profits. In particular, entry in an industry is hypothesized to occur whenever expected post-entry profits exceed the level of profits protected in the long run.

Empirical evidence in support of the model of entry in the managed economy is ambiguous at best. This leads Geroski (1991b, p. 282) to conclude,

> Right from the start, scholars have had some trouble in reconciling the stories told about entry in standard textbooks with the substance of what they have found in their data. Very few have emerged from their work feeling that they have answered half as many questions as they have raises, much less that they have answered most of the interesting ones.

Perhaps one reason for this trouble is the inherently static model used to capture an inherently dynamic process.[10]

In the entrepreneurial economy, the balance between market exchange and firm transactions leads to a different role for the entry of new firms. This is because the entrepreneurial economy is based more on the factor of new knowledge and less on the traditional factors of land, labor and capital upon which the managed economy thrived. There is an inherent difference between new knowledge and the traditional factors. As Knight (1921), and later Arrow (1962), emphasized, new economic knowledge is anything but certain. Not only is new economic knowledge inherently risky, but also substantial

[10] Manfred Neumann (1993, pp. 593–594) has criticized this traditional model of entry, as found in the individual country studies contained in Geroski and Schwalbach (1991), because they 'are predicated on the adoption of a basically static framework. It is assumed that start-ups enter a given market where they are facing incumbents which naturally try to fend off entry. Since the impact of entry on the performance of incumbents seems to be only slight, the question arises whether the costs of entry are worthwhile, given the high rate of exit associated with entry. Geroski appears to be rather sceptical about that. I submit that adopting a static framework is misleading. . . . In fact, generally, an entrant can only hope to succeed if he employs either a new technology or offers a new product, or both. Just imitating incumbents is almost certainly doomed to failure. If the process of entry is looked upon from this perspective the high correlation between gross entry and exit reflects the inherent risks of innovating activities. . . . Obviously it is rather difficult to break loose from the inherited mode of reasoning within the static framework. It is not without merit, to be sure, but it needs to be enlarged by putting it into a dynamic setting.'

asymmetries exist across agents both between and within firms (Milgrom and Roberts, 1987). The expected value of a new idea, or potential innovation, is likely to be anything but unanimous between the inventor of that idea and the decisionmaker, or group of decisionmakers, of the firm confronted with evaluating proposed changes or innovations.[11]

Combined with the bureaucratic organization of incumbent firms to make a decision, the asymmetry of knowledge leads to a host of agency problems, spanning incentive structures, monitoring and transaction costs. It is the existence of such agency costs, combined with asymmetric information, that not only provides an incentive for agents with new ideas to appropriate the expected value of their knowledge externally by starting new firms, but also with a propensity that varies systematically from industry to industry.[12]

To minimize agency problems and the cost of monitoring, bureaucratic hierarchies develop objective rules.[13] As Holmstrom (1989, p. 323) points out,

> Monitoring limitations suggest that the firm seeks out activities which are more easily and objectively evaluated. Assignments will be chosen in a fashion that is conducive to more effective control. Authority and command systems work better in environments, which are more predictable and can be directed with less investment information. Routine tasks are the

[11] It is because information is not only imperfect but also asymmetric that Knight (1921, p. 268) argued that the primary task of the firm is to process information in order to reach a decision: 'With the introduction of uncertainty—the fact of ignorance and the necessity of acting upon opinion rather than knowledge—into this Eden-like situation (that is a world of perfect information), its character is entirely changed. . . . With uncertainty present doing things, the actual execution of activity, becomes in a real sense a secondary part of life; the primary problem or function is deciding what to do and how to do it.'

[12] Alchian (1950) pointed out that the existence of knowledge asymmetries would result in the inevitability of mistaken decisions in an uncertain world. Later, Alchian and Demsetz (1972) attributed the existence of asymmetric information across the employees in a firm as resulting in a problem of monitoring the contribution accruing from each employee and setting the rewards correspondingly. This led them to conclude that, 'The problem of economic organisation is the economical means of metering productivity and rewards' (Alchian and Demsetz, 1972, p. 783). Coase (1937) and later Williamson (1975) argued that the size of an (incumbent) enterprise will be determined by answering what Coase (1937, p. 30) articulated as, 'The question always is, will it pay to bring an extra exchange transaction under the organising authority?' In fact, Coase (1937, p. 24) pointed out that, 'Other things being equal, a firm will tend to be larger the less likely the (firm) is to make mistakes and the smaller the increase in mistakes with an increase in the transactions organised.'

[13] Holmstrom (1989) and Milgrom (1988) have pointed out the existence of what they term as a *bureaucratization dilemma*, where, 'To say that increased size brings increased profit is a safe generalisation. To note that bureaucracy is viewed as an organisational disease is equally accurate' (Holmstrom, 1989, p. 320). In addition, Kreps (1991) has argued that such bureaucratic rules promote internal uniformity and that a uniform corporate culture, in turn, promotes the reputation of the firm. These bureaucratic rules, however, make it more difficult to evaluate the efforts and activities of agents involved in activities that do not conform to such bureaucratic rules.

comparative advantage of a bureaucracy and its activities can be expected to reflect that.

Williamson (1975, p. 201) has also emphasized the inherent tension between hierarchical bureaucratic organizations and the ability of incumbent organizations to appropriate the value of new knowledge for innovative activity outside of the technological trajectories associated with the core competence of that organization:

> Were it that large firms could compensate internal entrepreneurial activity in ways approximating that of the market, the large firm need experience no disadvantage in entrepreneurial respects. Violating the congruency between hierarchical position and compensation appears to generate bureaucratic strains, however, and is greatly complicated by the problem of accurately imputing causality.

This leads him to conclude that:

> I am inclined to regard the early stage innovative disabilities of large size as serious and propose the following hypothesis: An efficient procedure by which to introduce new products is for the initial development and market testing to be performed by independent investors and small firms (perhaps new entrants) in an industry, the successful developments then to be acquired, possibly through licensing or merger, for subsequent marketing by a large multidivision enterprise. . . . Put differently, a division of effort between the new product innovation process on the one hand, and the management of proven resources on the other may well be efficient. (Williamson, 1975, pp. 205–206)

The degree to which agents and incumbent firms are confronted with knowledge asymmetries and agency problems with respect to seeking out new economic knowledge and (potential) innovative activity would not be expected to be constant across industries. This is because the underlying knowledge conditions vary from industry to industry. In some industries new economic knowledge generating innovative activity tends to be relatively routine and can be processed within the context of incumbent hierarchical bureaucracies. In other industries, however, innovations tend to come from knowledge that is not of a routine nature and therefore tends to be rejected by the hierarchical bureaucracies of incumbent corporations. Nelson and Winter (1982) describe these different underlying knowledge conditions as

reflecting two distinct technological regimes—the entrepreneurial and routinized technological regimes: 'An entrepreneurial regime is one that is favorable to innovative entry and unfavorable to innovative activity by established firms; a routinized regime is one in which the conditions are the other way around' (Winter, 1984, p. 297). As the comparative advantage of the advanced industrial economies shifts towards innovative industries, what is true for those industries holds for entire countries.[14]

In the managed economy, there is likely to be relatively little divergence in the evaluation of the expected value of a (potential) innovation between the inventor and the decision-making bureaucracy of the firm. A great incentive for agents to start their own firms will not exist. In the entrepreneurial economy, however, a divergence in beliefs between the agent and the principal regarding the expected value of a (potential) innovation is more likely to emerge.[15] It is in the entrepreneurial economy where the start-up of new firms is likely to play a more important role, presumably as a result of the motivation to appropriate the value of economic knowledge.

2.9 Competition and Co-operation as Complements versus Competition and Co-operation as Substitutes

While models of competition generally assume that firms behave autonomously, models of co-operation involve linkages among firms. These linkages take various forms, including joint ventures, strategic alliances, and formal and informal networks (Gomes-Casseres, 1996, 1997). In the managed economy competition and co-operation are viewed as being substitutes. This is because firms are vertically integrated and compete primarily in product markets. Co-operation between firms in the product market reduces the

[14] Gort and Klepper (1982) argued that the relative innovative advantage between newly established enterprises and incumbent firms depends upon the source of information generating innovative activity. If information based on non-transferrable experience in the market is an important input in generating innovative activity, then incumbent firms will tend to have the innovative advantage over new firms. This is consistent with Winter's (1984) notion of the routinized regime, where the accumulated stock of non-transferrable information is the product of experience within the market, which firms outside of the main incumbent organisations, by definition, cannot possess. By contrast, when information outside of the routines practised by the incumbent firms is a relatively important input in generating innovative activity, newly established firms will tend to have the innovative advantage over incumbent firms. Arrow (1962), Mueller (1976) and Williamson (1975) have all emphasized that when such information created outside of the incumbent firms cannot be easily transferred to those incumbent enterprises—presumably due to the type of agency and bureaucracy problems described above—the holder of such knowledge must enter the industry by starting a new firm in order to exploit the expected value of his knowledge.

[15] In the framework of Hirschman (1970), if an agent in possession of potentially valuable economic knowledge is unable to exercise voice within an existing firm, only loyalty will prevent him from exercising exit by starting a new firm.

number of competitors and lessens the degree of competition. In the entrepreneurial economy firms are vertically independent and specialized in the product market. The greater degree of vertical disintegration in the entrepreneurial economy means that co-operation among independent firms replaces internal transactions within a large, vertically integrated corporation. At the same time, there are more firms, resulting in an increase in both the competitive as well as the co-operative interface. The likelihood that a firm may end up competing or co-operating with another firm is greater in the entrepreneurial economy. In addition, new and enhanced configurations bring independent firms together in new and unexpected ways.

As Griliches (1992) has pointed out, knowledge spillovers come from different people working on similar things. A rich set of empirical evidence supports Griliches' conjecture in identifying that knowledge spillovers are promoted in clusters of economic activity (Audretsch and Feldman, 1996; Audretsch and Stephan, 1996). Thus, co-operation between individuals as well as between different firms generates the spillover of knowledge and new ideas. There is a large incentive for individuals and firms to interact co-operatively to create and explore new ideas that would otherwise remain undiscovered.

At the same time, there is a high degree of competition among firms for new ideas. Knowledge embodied in individuals and teams of individuals that is not used by one firm will be pursued by another firm if it is perceived as valuable. Thus, there is a high degree of competition for new ideas by the very firms that are co-operating to create those ideas. In addition, the increased interaction of firms and individuals facilitates the rapid diffusion of new ideas and the outcome of efforts to generate new ideas across individuals in different firms as well as within firms. In the managed economy, the monopolization of information was typically associated with power: 'Information is power' and is to be shared sparingly seemed to be the practice within large organizations.

In studying the networks in California's Silicon Valley, Saxenian (1990, pp. 96–97) emphasizes that it is the co-operation between individuals which facilitates the transmission of knowledge across agents, firms and even industries, and not just a high endowment of human capital and knowledge in the region:

> It is not simply the concentration of skilled labor, suppliers and information that distinguish the region. A variety of regional institutions—including Stanford University, several trade associations and local business organizations, and a myriad of specialized consulting, market research, public relations and venture capital firms—provide technical, financial, and

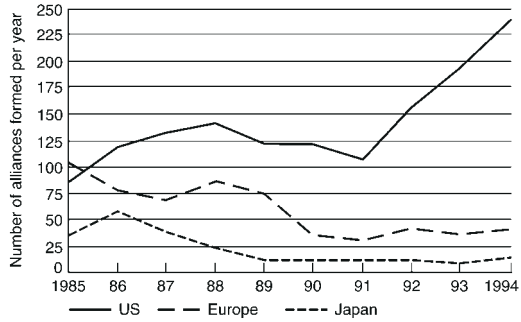

FIGURE 4. Industry technology alliances. Source: National Science Foundation, *Science and Engineering Indicators, 1996* (Washington, DC: US Government Printing Office, 1996), p. 158, taken from www.neweconomyindex.org/index.html.

> networking services which the region's enterprises often cannot afford individually. These networks defy sectoral barriers: individuals move easily from semiconductor to disk drive firms or from computer to network makers. They move from established firms to start-ups (or vice versa) and even to market research or consulting firms, and from consulting firms back into start-ups. And they continue to meet at trade shows, industry conferences, and the scores of seminars, talks and social activities organized by local business organizations and trade associations. In these forums, relationships are easily formed and maintained, technical and market information is exchanged, business contacts are established, and new enterprises are conceived. . . . This decentralized and fluid environment also promotes the diffusion of intangible technological capabilities and understandings.[16]

There is at least some empirical evidence suggesting that co-operative activity has been increasing over time. As Figure 4 shows, the number of formal technology agreements has increased in the United States.

Thus, in the managed economy increasing the amount of co-operation reduces the degree of competition. There are simply fewer rivals competing in the product market. In the entrepreneurial economy, both competition and co-operation exist simultaneously. An increase in competition may actually generate an increase in co-operation in the search for knowledge spillovers.

[16] Saxenian (1990, pp. 97–98) claims that even the language and vocabulary used by technical specialists is specific to a region, 'a distinct language has evolved in the region and certain technical terms used by semiconductor production engineers in Silicon Valley would not even be understood by their counterparts in Boston's Route 128'.

2.10 Flexibility versus Scale

The classic manner for reducing cost-per-unit in economics under the managed economy was through expanding the scale of output, or through exploiting *economies of scale*. In product lines and industries where a large scale of production renders a substantial reduction in average cost, large firms will have an economic advantage, leading to a concentrated industrial structure. The importance of scale economies no doubt contributed to the emergence and dominance of large corporations in heavy manufacturing industries such as steel, automobiles and aluminum (Chandler, 1977).

The alternative source of reduced average costs under the entrepreneurial economy is through flexibility. As Teece (1993, p. 218) argues, 'Flexible specialization . . . and contracting may today yield greater advantages than economies of scale and scope generated internally.' Industries where demand for particular products is constantly shifting require a flexible system of production that can meet such a shifting demand. There are four major sources of flexibility: technological, organizational, demand side and qualitative. These four sources of flexibility result in a decrease in the importance of scale economies.

Technological flexibility refers to the emergence of certain new technologies, such as computer numerically controlled machine tools that facilitate flexible production. Systematic attempts to estimate the impact of these new technologies on the extent of scale economies (Carlsson, 1989; Carlsson and Taymaz, 1994) have resulted in the conclusion that the importance of scale economies has been drastically reduced in industries where such flexible technology has been implemented.

The second manifestation of flexibility is in terms of the organization of production. While the organization of production was centered upon mass production during the first three decades of the 20th century, an alternative system of industrial organization, flexible specialization, re-emerged during the last several decades of that century (Piore and Sabel, 1984). Flexible production consists of producing smaller numbers of specially designed goods of a specific quality for a niche market. Such goods typically command a higher price and cannot be so easily diffused to lower-cost production locations. The organization of industry centered around flexible specialization typically contains five key elements:

- *A reliance upon multi-purpose equipment*. General-purpose equipment enhances the flexibility to rapidly change the product specifications to

meet specific demands of customers. This requires high levels of human capital and skilled labor.

- *Continual innovative activity*. Both the nature of the product(s) as well as production and organization methods are continually improved upon.
- *Clustering*. Groupings of enterprises, in both a product as well as a geographic dimension, provide a seedbed for the exchange of new ideas. Not only does physical proximity tend to facilitate the transmission of knowledge, but it also enhances the development of institutions and makes them more effective.
- *Networking*. Formal and informal links between enterprises, including subcontracting relationships, facilitate both increased economic specialization external to the firm as well as superior access to information.
- *Spillover effects*. Knowledge created within an enterprise spills over for use by other enterprises. Conversely, enterprises and individuals have access to external knowledge.

There is considerable evidence supporting the hypothesis that not only does flexible production provide a viable alternative to mass production as a system of industrial organization, but also that such systems centered around flexible production actually outperform those based on mass production. This evidence spans both developed and less developed countries (Piore and Sabel, 1984).[17]

The third type of flexibility refers to the ability of production to absorb demand fluctuations (Mills, 1984). There is a trade-off between efficiency, as measured by the costs of producing a given level of output, on the one hand, and flexibility, as measured by the costs of adjusting output, on the other hand. Large firms with high capital investment achieve a larger scale of output at a lower marginal cost than do small, labor-intensive enterprises. But the labor intensity of small firms enables them to adjust their current level of output at lower cost than their larger counterparts, which are capital and not labor intensive. As Brock and Evans (1989, p. 10) summarize, 'Smaller firms incur higher marginal production costs at a point in time than larger firms but include lower marginal adjust costs over time as demand fluctuates.'

The fourth type of flexibility refers to the ability for economic activity to

[17] One of the most striking examples of superior economic performance emerging from the industrial organization model of flexible production is provided by Emilia Romagna, a mixed agricultural–industrial region located in north central Italy with a population of around four million, and usually referred to as the 'Third Italy'. Through flexible production small firms have achieved a better economic performance than large enterprises by creating specialized industrialized districts where an agglomeration of producers in one industry work in close physical proximity. In what has become known as the 'Emilian Model of Production', the narrow division of labour common to large enterprises has been replaced by an organizational structure where employees perform a wide variety of different tasks (Piore and Sabel, 1984).

respond to qualitative changes in market demands. In a world of wealth and affluence, consumer demand is heterogeneous and fickle. Demand tends to proliferate across a broad spectrum of product class niches. The variances in consumer demand across product types and over time create a continuously changing set of product niches. Knowledge about these niches is uncertain for two reasons. First, the niches are difficult to observe and are changing. Second, the set of economic agents evaluating potential opportunities is heterogeneous. These two knowledge conditions are pivotal for understanding the entrepreneurial economy. This means that people are confronted with a variance in evaluations about the relevance of opportunities of the prospective ventures and, hence, the relevance of possible actions. Individuals who seek to appropriate the value of such knowledge by starting a new firm serve as *agents of change* by injecting flexibility into the economy. A common myth prevalent in the popular press is that small firms are more flexible than large firms. This belief suffers from a fallacy of composition. The mistake is committed at the unit of observation—the firm. Rather, the empirical evidence suggests that a population of firms, or an organization of industry consisting of diverse new and small firms, provides greater flexibility than does an organization of industry consisting of large corporations. Systematic empirical evidence is provided by Audretsch (1995) that the development and evolution of new industries is promoted by the presence of a large number of small firms, and by Audretsch and Thurik (2000) that national unemployment rates are lower in countries with a greater number of firms.

Scale economies were the engine that drove efficiency and growth in the managed economy. In the entrepreneurial economy the multiple dimensions of flexibility replace scale economies as the organizing principle for economic activity.

2.11 Stimulation versus Regulation

The public policies emerging in the postwar period of the managed economy dealing with the firm in the market were essentially constraining in nature. There were three general types of public policies towards business: antitrust (competition policy), regulation and public ownership. All three of these policy approaches restricted the firm's freedom to contract. While specific policy approaches tended to be more associated with one country than with others, such as antitrust in the United States, or public ownership in France and Sweden, all countries shared a common policy approach of intervening to restrain what otherwise was perceived as too much market power in the hands of firms.

Public policies constraining the freedom of the firm were certainly consistent with the *Weltanschauung* emerging from the theories and empirical evidence. Left unchecked, the large corporation in possession of market power would allocate resources in such a way as to reduce economic welfare. Through state intervention, the trade-off between efficiency on the hand and fairness on the other would be solved in a manner that presumably would be more socially satisfying. Galbraith (1956) is the seminal statement on the role of government in the managed economy, where state intervention typically involved the social partnership of big business, big government and big labor. This social partnership existed in nearly every Western economy.

In the entrepreneurial economy the relevant policy question has shifted away from 'How can the government constrain firms from abusing their market power?' to 'How can governments create an environment fostering the success and viability of firms?'[18] The major issues in the entrepreneurial economy have shifted away from concerns about excess profits and abuses of market dominance to international competitiveness, growth and employment. The concern about corporations is not that they are too successful and too powerful but that they are not successful enough. Jorde and Teece (1991) argued for the emasculation of the antitrust laws in order to enable American firms to co-operate and compete more effectively against their Japanese and European competitors.

As the waves of small start-ups in newly emerging high-technology industries demonstrate, the link between success and market power has been broken. The government policies of the entrepreneurial economy have increasingly shifted away from regulation to stimulation. Examples include the promotion of joint R&D programs, fostering efforts to innovate and the creation of new firms.

2.12 Targeting Inputs versus Targeting Outputs

Stimulation and regulation are not the only dimensions regarding the role of government policy in the managed and entrepreneurial economies. A second dimension involves targeting selected outputs or outcomes in the production process versus targeting selected inputs. Because of the relative certainty regarding markets and products in the managed economy, the appropriate policy response is to target outcomes and outputs. Specific industries along with particular firms could be promoted through government programs. The

[18] The Microsoft case suggests that the concern about market dominance is in terms of suppression of future innovative activity rather than profit levels.

targeting of specific firms in selected industries was clearly a successful policy for Japan in the postwar period and helped the Japanese achieve the competitive advantage in industries such as automobiles and electronics. As Joseph E. Stiglitz (1996) concludes from 'Some Lessons from the East Asian Miracle', 'government interventions acting together' (p. 151) account for at least part of the postwar Japanese growth miracle. The success of Japanese industrial policy in promoting a broad range of performance criteria, spanning trade performance to economic growth, has been painstakingly documented in a number of systematic empirical studies (Pugel, 1984; Audretsch and Yamawaki, 1988; Audretsch, 1989; Okuno-Fujiwara, 1991; Noland, 1993).

Targeting outputs has had a long tradition in Europe. As a response to 'the American Challenge', in the form of the dynamism, organization, innovation and boldness that characterize the giant American corporations, Servan-Schreiber (1968, p. 153) prescribed an R&D policy that would undertake 'the creation of large industrial units which are able both in size and management to compete with the American giants'. Because giant corporations were thought to be needed to amass the requisite R&D resources for innovation, Servan-Schreiber (1968, p. 159) argued that

> 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.

This R&D policy prescription of targeting outputs is echoed in the 1988 Cecchini Report to the Commission of the European Union, where the anticipated gains from European integration are measured in terms of reduced costs achieved through increases in scale economies when firms are no longer limited to domestic markets and can instead operate on a larger European market.

How relevant are targeting outputs and outcomes today? One has to wonder what would have happened to the US computer semiconductor industry had IBM been selected as 'a national interest' around 1980 and promoted through favorable treatment as well as protected from threats like Apple Computer, Microsoft and Intel. Would the United States be as strong in the computer, semiconductor and software industries as it is today? While the proclamation, 'What is good for General Motors is good for America' may have been sensible in the managed economy, it no longer holds in the entrepreneurial economy.

The entrepreneurial economy is based less on the traditional inputs of land, labor and capital, and more on the input of knowledge. It is no longer certain what products should be produced, how they should be produced, and by whom. There are many indicators reflecting the shift towards greater uncertainty associated with knowledge-based economic activity. For example, Kortum and Lerner (1997, p. 1) point to 'the unprecedented recent jump in patenting in the United States', as evidenced by the rise in applications for the US patents by American inventors since 1985, which exceeds the increase in any other decade in this century. Throughout this century, patent applications fluctuated within a band between 40 000 and 80 000 per year. By contrast, in 1995 there were over 120 000 patent applications. Similarly, Berman *et al.* (1997) have shown that the demand for less skilled workers has decreased dramatically throughout the OECD, while at the same time the demand for skilled workers capable of dealing with uncertainty has exploded.

This increased degree of uncertainty increases the difficulty of selecting the correct outcomes and increases the likelihood that the wrong firm and industry will be targeted. Rather, the appropriate policy in what Krugman (1994) terms 'the Age of Uncertainty' is to target inputs, and in particular those inputs involved in the creation and commercialization of knowledge. Such policies involve basic and applied research at universities and research institutes, investment in the general level of education as well as advanced technical specialties, and the training and upgrading of the skill levels of workers.[19] While outcomes and outputs in the form of specific industries and even firms are targeted in the managed economy, the entrepreneurial economy calls for policy that creates an environment, or *Rahmenbedingungen*, facilitating the creation and commercialization of knowledge.

2.13 Local Policy versus National Policy

The rationale and target of policy—stimulation versus control and inputs versus outputs—are not the only aspects to differ between the managed and entrepreneurial economies. A third dimension involves the locus of policy. Under the managed economy, the appropriate locus of policy-making is at the national or federal level. While the targeted recipients of policy may be localized in one or a few regions, the most important policy-making institutions tend to be at the national level. By contrast, under the entrepreneurial

[19] For example, the Hope Scholarship in the state of Georgia enables all students to attend the state universities for free as long as they maintain a B average.

economy, the locus of government policy towards business tends to be decentralized and regional in nature.

In the managed economy, a federal or national locus of control of large, oligopolistic firms in command of considerable market power is appropriate. This is because the benefits and costs derived from that market power are asymmetric between the local region where the firm is located and the national market, where the firm sells its product. Not only is production concentrated in one or just several regions, but the workers along with ancillary suppliers also tend 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 unionization. Higher profits resulting from market power are shared by labor. Workers and firms in their 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 are not as likely to be successful if they are implemented on the local level. Rather, as Olson (1982) predicts, a regional locus of policy towards business in the managed economy 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.

The most important institutions administering antitrust policy and regulation, which were given a mandate by the US Congress to constrain the market power of big business during the era of the managed economy, were at the national level. Beginning with the Sherman Act of 1890 and the Interstate Commerce Act of 1890, which established the first federal regulatory agency, the mandate for the control of large oligopolistic enterprises with substantial market power was mainly at the level of the federal government (Audretsch, 1989). The Antitrust Division of the US Justice Department combined with the Federal Trade Commission to safeguard America against the abuse of market power, while a broad range of federal regulatory agencies, starting with the Interstate Commerce

Commission and later the Federal Communications Commission and the Civil Aeronautics Boards, were created to regulate large, oligopolistic firms in concentrated markets. But starting during the Carter administration of the late 1970s and continuing in the administrations of presidents Reagan, Bush and Clinton, antitrust has been de-emphasized and a 20 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 government intervention is to confuse the downsizing of government with a reshifting of the locus of government policy away from the federal level to the local level. The last two decades have seen the emergence of a set of policy initiatives at the local level. The new industrial policy of the entrepreneurial economy is decentralized and regional in nature. As Sternberg (1996) emphasizes in his review of successful technology policy 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 (UK). 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 regional policy.

Eisinger (1990) asks the question, 'Do American states do industrial policy?' Lowery and Gray (1992) confirm Eisinger's affirmative answer by analyzing the impact of state industrial policy in 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 different 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 developing the high-tech cluster around Austin. The Thomas Edison Centers in Ohio,[20] the Advanced Technology Centers in New Jersey, and the Centers for Advanced Technology at Case Western Reserve University,

[20] See Carlsson and Braunerhejelm (1999) for an analysis about the role of the Edison Biotechnology Center in creating biomedical clusters in Ohio.

Rutgers University and the University of Rochester have supported generic pre-competitive research.[21]

This shift in the locus of policy is the result of two factors. First, because the competitive source of economic activity in the entrepreneurial economy is knowledge, which tends to be localized in regional clusters, public policy requires an understanding of regional-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 government policy in the entrepreneurial economy is 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 is the case in the managed economy. There is no reason that the promotion of local economies imposes a cost on consumers in the national economy, so that local intervention is justified and does not result in any particular loss incurred by agents outside of the region.

2.14 Risk Capital versus Low-risk Capital

In the managed economy, the systems of finance in Europe have provided the existing companies with liquidity for investment.[22] This is particularly true in countries such as Germany, where the banks are allowed to hold equity positions in private companies (Cable, 1985). Many scholars have argued that allowing bank ownership of private companies has given Germany a superior mechanism linking finance to production (Mayer and Alexander, 1990; Edwards and Fischer, 1994). The evidence suggests this was true as long as Germany's comparative advantage was in traditional industries, such as automobile production, machine tools and metalworking (Audretsch and Elston, 1997). But as the comparative advantage in the European Union shifts away from managed industries towards entrepreneurial activities, the demand for finance also shifts away from financing investment in traditional industries towards high-risk ventures. This means that, under the entrepreneurial economy, the traditional means of finance are not longer appropriate. Of particular importance is venture capital, which has traditionally been a form of finance for high-risk, innovative new firms and the informal capital

[21] It should be emphasized that clearly, not all local interventions are effective.

[22] For a very thorough analysis on finance, see Hughes and Storey (1994), Storey (1994), and the special issues of *Small Business Economics* devoted to *European SME Financing* (Cressy and Olofsson, 1997), and to *Financing and Small Firm Dynamics* (Reid, 1996).

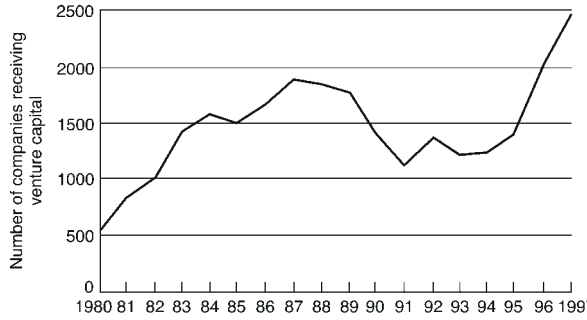

FIGURE 5. Number of companies receiving venture capital. Source: The National Venture Capital Association 1997 Annual Report (Arlington, VA: NVCA, 1998), prepared by Venture Economics (a division of Securities Data Company), taken from www.neweconomyindex.org/index.html.

market (Gaston, 1989; Gompers, 1999). As Figure 5 shows, venture capital has recently become more prevalent.

Informal risk capital is equity and near-equity invested by private individuals directly, i.e. informally, without formal intermediation (Mason and Harrison, 1997). Near-equity investments refer to loans or loan guarantees provided by individuals to firms where the individuals hold an equity. This has been referred to in the finance literature as informal debt or informal risk capital. Such informal risk capital is virtually the only source of risk or venture-type capital for most small and medium-sized enterprises, once their capital needs surpass family resources (Hughes, 1993). As Gaston points out, 'Informal capital markets are the leading sources of external source of external risk capital fuelling entrepreneurial start-ups and small business growth' (Gaston, 1989, p. 223).

Because the availability of venture capital and informal capital varies substantially across countries, new ventures flourish where they have the easiest access to finance. For example, the institution of venture capital is considerably more developed in the United States than in Europe. And the manner in which that venture capital is used also varies between Europe and the United States. The deficiency of venture capital and informal capital has impeded restructuring in the form of a liquidity constraint on people seeking finance to start a new company in a new industry.

The entrepreneurial economy requires a different system of finance to that in the managed economy. Since the managed economy was based on certainty in outputs as well as inputs, a strong connection between banks and firms fostered growth. Certainty has given way to uncertainty in the entrepreneurial economy, and therefore financial institutions must also change.

3. *Conclusions*

The continued rise in unemployment coupled with stagnant growth in Europe has triggered a plea by policy-makers for a rethink on the policy approach that ushered in European prosperity during the postwar era. Those countries that have succeeded in creating new jobs and reducing unemployment seem to have accomplished this at the cost of lower wages and a deterioration in civil society. The resulting policy debate has been miscast as the European model versus the American model. This debate is wrong because it confuses a fundamental shift in economic systems with what used to be a recognized and widely accepted policy trade-off. The policy debate should be instead cast as the entrepreneurial versus the managed economy.

The managed economy flourished for most of the 20th century. It was based on relative certainty in outputs, which consisted mainly of manufactured products, and in inputs, which consisted mainly of land, labor and capital. The twin forces of globalization have reduced the ability of the managed economies of Western Europe and North America to grow and create jobs. On the one hand has come the advent of new competition from low-cost but relatively highly educated and skill-intensive countries in Central and Eastern Europe as well as Asia. On the other hand, the telecommunications and computer revolutions have drastically reduced the cost of shifting not just capital but also information out of the high-cost locations of Europe and into lower-cost locations around the globe. Taken together, these twin forces of globalization mean that economic activity in a high-cost location is no longer compatible with routinized tasks. Rather, globalization has shifted the comparative advantage of high-cost locations to knowledge-based activities, and in particular search activities, which cannot be costlessly transferred around the globe.

Knowledge as an input into economic activity is inherently different from land, labor and capital. It is characterized by high uncertainty, high asymmetries across people and is costly to transact. The response to an economy where knowledge is the main source of comparative advantage is the entrepreneurial economy. This paper has identified 14 characteristics that differ between the entrepreneurial and managed economies, and provides a framework for understanding how the entrepreneurial economy fundamentally differs from the managed economy. Such a framework provides a lens through which to interpret economic events and formulate policy. Application of the wrong lens leads to the wrong policy choice. For example, under the managed economy firm failure is viewed negatively and as representing a drain on society's resources. According to this view, resources should not be invested in higher risk ventures. When viewed through the lens

of the entrepreneurial economy, firm failure is interpreted differently. It is seen as an experiment, an attempt to go in a new direction in an inherently risky environment. An externality of failure is learning. In the entrepreneurial economy, failure accompanies the process of searching for new ideas. It similarly follows that the positive virtues of long-term relationships, stability, continuity under the managed economy give way to flexibility, change and turbulence in the entrepreneurial economy. What is a liability in the managed economy is, in some case, a virtue in the entrepreneurial economy.

The current policy debate has been erroneously miscast as more versus less government. The wave of government downsizing, combined with deregulation, privatization and the retreat of antitrust, has created an impression that there is no longer a role for government to play other than to get out of the way of private interests. What has been overlooked is the inherently different role of government policy in the entrepreneurial compared to the managed economy. The well-documented high-technology clusters of the world have not been created in a vacuum. The policies helping to shape such innovative clusters are not only different in that they are local, rather than national, but they also target inputs in the process of creating and commercializing knowledge, rather than outputs, such as particular firms.

Government policy in the managed economy was largely about control. High certainty dictated that it was known what to produce, how it should be produced and who would produce it. The role of government was to constrain the power of large corporations, which were needed for efficiency under mass production, but posed a threat to democracy through their concentration of power. Under the managed economy the policy debate centered on competition policies (antitrust), regulation and public ownership of business. In the entrepreneurial economy these constraining policies have become increasingly irrelevant. The central role of government policy in the entrepreneurial economy is enabling in nature. The focus is to foster the production and commercialization of knowledge. Rather than focus on limiting the freedom of firms to contract through antitrust, regulation and public ownership, government policy in the entrepreneurial economy targets education, increasing the skills and human capital of workers, and facilitating the mobility of workers and their ability to start new firms.

The economic failure of the Soviet Union and its Eastern European satellites was to a great extent a failure to participate in the micro-electronic revolution.[23] Computerized technology implied a shift away from a concentrated

[23] Sylos-Labini (1992, p. 63) observed that, 'In the last two or three decades, after a number of attempts that ailed at decentralising 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

and rigid structure and toward a fluid, decentralized system as the most efficient means of production, which constituted a direct threat to the political principle of centralizing all information and decision-making under Communism. While the demise of Communism has been widely celebrated as a victory for Western capitalism, what has been overlooked is that the system of capitalism dominating most of the 20th century—the managed economy—is now itself under attack by the same forces that undermined Communism.

The prevailing view about the gains to Europe through integration has been formulated in terms of lower costs resulting from a greater exploitation of scale economies. The 1988 Cecchini Report, building on the tradition of Servan-Schreiber (1968), measured these gains to Europe in terms of cost reduction. Through growth, mergers, combinations and rationalization, larger European firms will generate gains to European consumers in the form of lower costs. Convergence of institutions and nations in Europe is a goal, since this facilitates the single European markets and large-scale production and sales. Focusing on scale economies resulting from a large market size is a metric implicit in the managed economy. The analysis of this paper, focusing instead on the entrepreneurial economy, predicts that *the major economic benefits of European integration will come not through economies of scale, but rather through economies of diversity*. In an uncertain world, the diversity of European cultures and institutions is well positioned to generate a diversity of different approaches to economic problems. Diversity, not convergence, generates innovation and growth.

A series of empirical studies has identified that a pervasive shift in the industrial structure away from large corporations and towards small enterprises has taken place between the mid-1970s and early 1990s (see the country studies of Loveman and Sengenberger, 1991; Acs and Audretsch, 1993; Thurik, 1999). This shift occurred not just in one or a few of the developed countries but rather in virtually every single leading industrial country. Is such a shift desirable and should the resulting industrial structure be promoted or avoided? Prevailing economic theory provides a set of ambiguous answers, which essentially depend upon a number of trade-offs between what is gained and lost by shifting economic activity towards smaller enterprises. While this ambiguity cannot be easily resolved, in this paper we have attempted to identify at least the most important of these trade-offs. The empirical evidence from linking growth rates to changes in the industrial

economic, organisational, 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

structure suggests that the ongoing shift towards smaller enterprises tends to promote rather than retard economic growth.[24] Those countries that have introduced a greater element of entrepreneurship have been rewarded with additional growth.[25] It is now the task of policy makers also seeking to reward their economies with additional growth, to reformulate policy in harmony with the shift from the managed to the entrepreneurial economy.

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United States, owe much to the contribution of small firms—has shown increasing signs of weakness.' See also Nelson (1992).

[24] Carree and Thurik (1998, 1999) provide analyses showing the consequence of lagging behind in this restructuring process in manufacturing. Using a sample of 14 manufacturing industries in 13 European countries and 13 manufacturing industries in 12 European countries, respectively, they find that, on average, the employment share of large firms in 1990 has a negative effect on growth of output in the subsequent four-year period.

[25] Thurik (1996) shows that the percentage growth of GNP is explained using a structural shift. This shift is captured by the difference between the annual percentage growth of value-of-shipments of large firms (with employment of less than 500 employees) and the annual percentage growth of value-of-shipments of small firms (with employment of at least 500 employees), using data for three distinct time periods: 1988–90, 1989–92 and 1990–93 for all 12 old member countries of the European Union. See also Audretsch and Thurik (2000) where some calculations are presented showing that a rise in the number of entrepreneurs, i.e. self-employed per laborforce, leads to lower levels of unemployment. They use data material from 23 OECD countries including the 15 countries of the EU-15, Iceland, Norway, Switzerland, Canada, Australia, New Zealand, Japan and US for the period 1974–94. Further evidence is provided by Schmitz (1989) and Nickell (1996). Schmitz presents a theoretical endogenous growth model which relates entrepreneurial activity and economic growth. He shows that an increase of the proportion of entrepreneurs in the working force leads to an increase in long-run economic growth. Nickell studies the

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