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Entrepreneurship
AND
Economic Growth

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Entrepreneurship and Economic Growth

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Max Planck Institute of Economics

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Entrepreneurship and Economic Growth

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1

Introduction

Following the 1990s, the decade of Europe's worst economic performance since World War II, including record unemployment, it may not have been surprising when a bold new strategy to spur economic growth was unveiled. However, the focus of this new European growth policy would have seemed unimaginable only a few years earlier. With the 2000 Lisbon Proclamation, Romano Prodi, president of the European Commission, committed the European Union (EU) to becoming the world's entrepreneurship leader by 2020 in order to ensure prosperity and a high standard of living throughout the EU.

Romano Prodi and the European Union are not alone in turning to entrepreneurship to provide the engine of economic growth. The entrepreneurial policy mandate mirrored similar efforts throughout the developed world. As Edward Lazear emphasizes, "The entrepreneur is the single most important player in a modern economy" (Lazear, 2002, p. 1). Public policy spanning a broad spectrum of national, regional, and local contexts is turning to entrepreneurship to replace old jobs that have been lost to outsourcing and globalization, while at the same time harnessing the potential that remained largely dormant from significant long-term investments in knowledge, such as universities, education, and research institutions.

Only a few years earlier the policy debate focusing on growth and employment had looked to the macroeconomic instruments of fiscal and monetary policy on the one hand and the size and scale economies yielded by the large corporation on the other. After all, scholars such as Joseph Schumpeter (1942), John Kenneth Galbraith (1962), and Alfred Chandler (1977) had convinced a generation of policy-makers that efficiency and growth lay in the domain of large corporations and that small business would simply fade away under the weight of its own inefficiency.

Linking entrepreneurship to economic growth is certainly not new. In his 1911 classic treatise, *Theorie der wirtschaftlichen Entwicklungen* (Theory of Economic Development), Schumpeter proposed that entrepreneurs starting new businesses provided the engine for economic growth. Even in his 1942 classic, *Capitalism, Socialism, and Democracy*, Schumpeter (p. 13) still argued that entrenched large

corporations tend to resist change, forcing entrepreneurs to start new firms in order to pursue innovative activity:

The function of entrepreneurs is to reform or revolutionize the pattern of production by exploiting an invention, or more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way... . To undertake such new things is difficult and constitutes a distinct economic function, first because they lie outside of the routine tasks which everybody understands, and secondly, because the environment resists in many ways.

While the intellectual contribution of Schumpeter remains enormous and virtually unrivaled, his impact on public policy debate seemed limited at best. Certainly in the decades following his work, very little policy attention focused on new and small firms as engines of economic growth.

The purpose of this book is to explain why this changed and how entrepreneurship became more important, particularly in the arena of public policy to foster growth and create jobs. In particular, this book provides an explicit link between entrepreneurship and economic growth by asking, “Why does entrepreneurship matter?” along with “How does entrepreneurship matter?”

Chapter 2 explains how the role of entrepreneurship evolved over time. The role of small and new firms, at least as analyzed by the prevailing literature during the second half of the previous century, generally focused on productive efficiency. Just as the Solow model directed the public policy focus on capital as the driving factor of economic growth, the structure most conducive to the efficient organization of that capital, at both the industry and firm levels, did not seem particularly receptive to small business. When it came to productive efficiency, small firms were clearly at a competitive disadvantage.

Of course, as William Baumol (2002, p. 1) recently pointed out, innovative activity may be more important than productive efficiency, particularly in terms of generating economic growth: “Under capitalism, innovative activity—which in other types of economy is fortuitous and optional—becomes mandatory, a life-and-death matter for the firm.” Certainly the intellectual revolution triggered by the introduction of the endogenous growth models (Romer, 1984; Lucas, 1993) placed knowledge and innovation at the center of economic growth. A more recent literature has focused on the innovative capabilities of small and new enterprises. Though some studies found that small and new firms were surprisingly innovative, they provided less compelling insights about why and how entrepreneurial firms were able to contribute to innovative activity. After all, as the Griliches (1979) model of the knowledge production function made clear, knowledge inputs are a prerequisite for innovative output, and the limited size and resources of small and new firms seemingly restrict their capacity to generate new knowledge, at least in absolute terms.

Thus, in order to understand the link between entrepreneurship and economic growth, the *Knowledge Spillover Theory of Entrepreneurship* is introduced in chapter 3. Like any theory of entrepreneurship, the Knowledge Spillover Theory of Entrepreneurship is based on the cognitive processes of individuals involving recognition and exploitation of (entrepreneurial) opportunities. However, unlike the traditional theories of entrepreneurship, in this theory these opportunities are

not taken to be exogenous, or given. Rather, they are endogenously created as the result of targeted and systematic efforts to produce knowledge and new ideas by private firms, universities, and research institutes.

Thus, in this view entrepreneurial opportunities are created not by the entrepreneurial firms themselves but rather as a by-product of efforts by incumbent firms and other organizations to generate new knowledge without, however, the ability to fully and exhaustively appropriate the returns from their own knowledge investments. Chapter 3 develops the *Endogenous Entrepreneurship Hypothesis*, which posits that entrepreneurial opportunities will be systematically greater in contexts that are rich in knowledge investments but more restricted in contexts with impoverished knowledge.

Models of endogenous growth (Romer, 1984, 1990; Lucas, 1988) recognized not only that knowledge should be endogenously included in the production function as an explicit factor generating economic growth but also that, as result of the propensity for knowledge to spill over for use by third-party firms, it is particularly potent in generating growth. Chapter 3 contests the assumption that knowledge automatically spills over for use and commercialization by third-party firms. Rather, evoking the properties of knowledge and new ideas identified by Arrow (1962), we suggest the existence of a knowledge filter that impedes the commercialization and spillover of knowledge. The mere fact that firms and universities invest in the creation of new knowledge by itself does not guarantee the commercialization of that knowledge. Thus, entrepreneurship makes an important contribution to economic growth by providing a conduit for the spillover of knowledge that might otherwise have remained uncommercialized.

Of course, the existence of entrepreneurial opportunities alone does not result in the recognition and implementation through the creation of new firms and other organizations. Rather, barriers to entrepreneurship may impede or even preempt the entrepreneurial response to perceived opportunities. This suggests that the capacity to generate entrepreneurial activity, or the endowment of entrepreneurship capital, is specific to each context. The *Growth Hypothesis* posits that by serving as a mechanism for knowledge spillovers, entrepreneurship should have a positive impact on economic performance in general and on growth in particular.

Endogenous entrepreneurship serving as a conduit of knowledge spillovers and ensuring positive impact on economic growth emanates from commercializing knowledge and new ideas that might otherwise not have been pursued. An important insight from the new economic geography is that knowledge spillovers tend to be geographically bounded. Thus, the *Localization Hypothesis* posits that entrepreneurial firms derived from knowledge spillovers also tend to cluster within close geographic proximity to knowledge sources. That geographic proximity to a knowledge source bestows competitive advantage to entrepreneurial firms is posited by the *Performance Hypothesis*.

The existence of external knowledge may not guarantee that entrepreneurial firms can access and absorb knowledge spillovers. Just as Cohen and Levinthal (1989) suggested that large corporations invest in research and development (R&D) to generate the requisite absorptive capacity for accessing external knowledge, new and small knowledge-based firms may also need to access and absorb external

knowledge. However, the strategies deployed by their larger and more established counterparts, such as investing in large R&D laboratories, may be preempted by the inherently small size of new startups. Thus, the *Entrepreneurial Access Hypothesis* suggests that entrepreneurial firms will develop and deploy strategies to facilitate the access and absorption of external knowledge. Similarly, the *Entrepreneurial Finance Hypothesis* posits that entrepreneurial firms are more likely to be financed by nontraditional sources of finance, such as venture capital.

These main hypotheses, introduced in chapter 3, suggest why and how entrepreneurship will affect economic growth. In the subsequent seven chapters, they are subjected to systematic econometric scrutiny to shed light on their plausibility and possible validity.

All of these chapters center on measurement, but they also evoke a number of conceptual issues common across all chapters. One of these involving both conceptual and measurement issues is the idea of entrepreneurship. Although entrepreneurship is widely acknowledged as a vital force in the economies of developed countries, there is little consensus about what actually constitutes entrepreneurial activity. Scholars have proposed a broad array of definitions, which, when operationalized, have generated a number of different measures (Hébert and Link, 1989).

Hébert and Link (1989) have identified three distinct intellectual traditions in the development of the entrepreneurship literature: the German tradition, based on Johana Heinrich von Thuenen and Schumpeter; the Chicago tradition, based on Frank Knight and Theodore Schultz; and the Austrian tradition, based on Ludwig von Mises, Israel Kirzner, and George Shackle. The Schumpeterian tradition has had the greatest impact on the contemporary entrepreneurship literature. The distinguishing feature of the Schumpeterian view is that entrepreneurship is a disequilibrating phenomenon rather than an equilibrating one.

Despite the Schumpeterian emphasis on the process of starting a new enterprise as the defining feature of entrepreneurial activity, there is no generally accepted definition of entrepreneurship for developed countries (Organization for Economic Cooperation and Development [OECD], 1998). The lack of a single definition of entrepreneurship reflects the fact that it is a multidimensional concept. The actual definition used to study or classify entrepreneurial activities reflects a particular perspective or emphasis. Usually, definitions of entrepreneurship vary most between the economic and management perspectives.

From the economic perspective, Hébert and Link (1989) distinguish between the supply of financial capital, innovation, allocation of resources among alternative uses, and decision making. Thus, the entrepreneurial function encompasses the entire spectrum of these functions: “The entrepreneur is someone who specializes in taking responsibility for and making judgmental decisions that affect the location, form, and the use of goods, resources or institutions” (Hébert and Link, 1989, p. 213).

By contrast, from the management perspective, Sahlman and Stevenson (1991, p. 1) differentiate between entrepreneurs and managers in that “entrepreneurship is a way of managing that involves pursuing opportunity without regard to the resources currently controlled. Entrepreneurs identify opportunities, assemble required resources, implement a practical action plan, and harvest the reward in a timely, flexible way.”

The most prevalent and compelling views of entrepreneurship focus on the perception of new economic opportunities and the subsequent introduction of new ideas in the market. As Audretsch (1995) argues, entrepreneurship is about change, just as entrepreneurs are agents of change; entrepreneurship is thus about the process of change. This corresponds to the definition of entrepreneurship proposed by the OECD: “Entrepreneurs are agents of change and growth in a market economy and they can act to accelerate the generation, dissemination and application of innovative ideas... . Entrepreneurs not only seek out and identify potentially profitable economic opportunities but are also willing to take risks to see if their hunches are right” (OECD, 1998, p. 11).

Although the simplicity of defining entrepreneurship as activities fostering innovative change is attractive, such simplicity also masks considerable ambiguity. The notion of entrepreneurship is a complex one for at least two reasons. First, entrepreneurship crosses multiple organizational forms. Does entrepreneurship refer to the change-inducing activities of individuals; groups of individuals such as networks, projects, lines of business, firms, and even entire industries; or even geographic units of observation, such as agglomerations, clusters, and regions? Part of the complexity involved with entrepreneurship is that it involves all of these types of organizational forms. No single organizational form can claim a monopoly on entrepreneurship.

The second reason for entrepreneurial complexity is that the concept of change is relative to some benchmark. What may be perceived as change to an individual or enterprise may not involve any new practice for the industry. Or it may represent change for the domestic industry but not for the global industry. Thus, the concept of entrepreneurship is embedded in the local context. At the same time, the value of entrepreneurship is likely to be shaped by the relevant benchmark. Entrepreneurial activity that is new to the individual but not the firm or industry may be of limited value. Entrepreneurial activity new to the region or country may be significant but ultimately limited. By contrast, entrepreneurial activity new across all organizational forms, all the way to the global scale, carries the greatest potential value.

Thus, one of the most striking features of entrepreneurship is that it crosses a number of key units of analysis. At one level, entrepreneurship involves the decisions and actions of individuals acting alone or within the context of a group. At another level, entrepreneurship involves analyses of firms and industries as well as cities, regions, and countries.

Operationalizing entrepreneurship for empirical measurement is difficult (Storey, 1991). The degree of difficulty involved increases exponentially for cross-country comparisons. Studies focusing on a single country, either in a cross-sectional or time series context, have deployed a variety of proxy measures spanning self-employment rates, business ownership rates, and new-firm startups (births), as well as other measures of industry demography, such as turbulence (turnover) or the extent of simultaneous births and exits and net entry. An ideal measure of entrepreneurship would incorporate all aspects of these. However, systematic measurement conducive to cross-country comparisons is limited.

The different contexts and organizational forms involving entrepreneurship account for the paucity of measures used to reflect entrepreneurial activity.

Measures of self-employment reflect change that is occurring for individuals starting a new business. Because very little of this change is projected onto the larger industry, nation, or global economy, self-employment as a measure of entrepreneurial activity has been criticized. What is new and different for the individual may not be so different for the industry or global market. Even for a developed country such as the United States, only a very small fraction of new startups are, in fact, innovative. Still, measures of self-employment are widely used to reflect the degree of entrepreneurial activity, largely because they are measured in most countries, and measured in comprehensive facilitating comparisons across countries and over time (Parker, 2004; Parker, Belghitar, and Barmby, 2005).

Audretsch et al. (2002) and Carree et al. (2001) use a measure of business ownership rates to reflect degree of entrepreneurial activity. This measure is defined as the number of business owners (in all sectors excluding agriculture) divided by the total labor force. A number of important qualifications for this measure should be emphasized. First, it lumps together all types of a very heterogeneous activity across a broad spectrum of sectors and contexts. This measure treats all businesses as the same, both high-tech and low-tech. Second, it is not weighted for magnitude or impact. Again, all businesses are measured identically, even though some clearly have a greater impact. Third, this variable measures the stock of businesses and not the startup of new ones. Still, this measure has two significant advantages. First, while not a direct measure of entrepreneurship, it is a useful proxy for entrepreneurial activity (Storey, 1991). And it is measured and can be compared across countries and over time.

Other measures of entrepreneurship focus more on change that corresponds to innovative activity for an industry. Such measures include indicators of R&D activity, the numbers of patented inventions, and new product innovations introduced into the market (Acs and Audretsch, 1988, 1990). These measures have the advantage of including only firms that actually generate change at the industry level, that is, beyond the firm itself. However, such measures must always be qualified by their failure to incorporate significant types of innovative activity and change (Griliches, 1990).

Similarly, other measures of entrepreneurial activity focus solely on the criterion of growth. Firms exhibiting exceptionally high growth over a prolonged duration are classified as *gazelles*. For example, Birch (1999) measures the number of gazelles to reflect entrepreneurship. Such measures of entrepreneurship must also be qualified for their narrow focus not only on a single unit of observation—enterprises—but also on a single measure of change: growth.

Lundström and Stevenson (2001, 2005) followed the precedent of the Global Entrepreneurship Monitor (GEM) study (Reynolds et al., 2000) by defining and measuring entrepreneurship as “mainly people in the pre-startup, startup and early phases of business” (2001, p. 19). This definition has a tilt toward nascent entrepreneurs and startups because “these are the targets for entrepreneurship policy measures.” An obvious limitation of this approach is that it restricts entrepreneurial activity to the process of starting a new firm, which no doubt reflects individual change and innovation but not the contribution of incumbent enterprises of all sizes, or what is sometimes referred to as intrapreneurship. Lundström and

Stevenson (2001, p. 19) justify their emphasis on prestartup and startup as well as the incipient and early stages of business ownership because “these are the targets for entrepreneurship policy measures and we propose that entrepreneurship policy measures are taken to stimulate individuals to behave more entrepreneurially. It is our position that this can be done by influencing motivation, opportunity and skill factors. Therefore, our aim is to see what types of policy actions are taken towards individuals in the pre- and early stages of idea and business development.”

Although entrepreneurship is a heterogeneous activity encompassing a broad spectrum of disparate organizations and types of activities, many of the conventional definitions and measures are, in fact, remarkable for reflecting entrepreneurship as a homogeneous activity. Because of the focus of entrepreneurship as a conduit for knowledge spillovers, this study restricts the focus, both in concept and in measurement, to new-firm startups.

In the empirical analyses, the book focuses on a single national context: Germany. Restricting the study to a single country provides an implicit control for a number of crucial factors that can introduce bias into cross-country studies, such as institutions, culture, history, laws, and regulations. We selected Germany as the particular national context for several reasons. First and foremost, it provides a national context where entrepreneurship has not seemingly played an important role, at least in recent decades. Many scholars and policy-makers remain skeptical about whether entrepreneurship is compatible with German institutions, historical traditions, and culture and social capital. We wish to neither support nor contest this proposition. But against such a skeptical background, if the main hypotheses derived from the Knowledge Spillover Theory of Entrepreneurship can be confirmed in the context of Germany, they would certainly have more credibility. While Frank Sinatra's lyric, “If you can make it there, you'll make it anywhere,” might not apply exactly, Germany certainly presents a sterner test than other nations more readily associated with and already well under way toward creating an entrepreneurial economy.

Furthermore, we chose Germany as the *Gegenstand* or subject for this analysis because the country confronts substantial job displacements and outsourcing due to globalization, while at the same time having one of the world's most prominent and enviable levels of investment in knowledge and human capital.

Chapters 4 and 5 examine if and why entrepreneurship affects economic growth. In testing the Endogenous Entrepreneurship and Growth Hypotheses, spatially aggregated units of observation are required. It is the premise underlying not just the New Economic Geography but also the Localization Hypothesis that knowledge spillovers are spatially localized. This suggests using a spatially aggregated but geographically bounded unit of observation. We met this requirement by choosing a dataset on German counties (or *Kreise*) for our empirical analysis. The important variables in these chapters include measures of regional growth and startup rates. Such spatial variation within a single national context controls for country-specific factors such as laws and other national institutions but allows for variation across local contexts. Thus, both the national and local contexts matter, but in this case the national context is held constant while variations across the local context are probed for their influence on the relevant dependent variable.

Chapters 6 through 9 test the main hypotheses focusing on how entrepreneurship affects economic growth and use the firm as the unit of observation. These chapters all employ the same database, which is derived from German firms making an Initial Public Offering (IPO). These firms are generally knowledge-based startups, many of which involve high technology. Such a database is, of course, highly biased. While the IPO database is anything but representative of German firms, let alone other firms around the world, it does include firms in which new knowledge and ideas play an important role. Thus, this firm-level database provides a useful window through which to observe and analyze the behavior of entrepreneurs responding to opportunities generated by knowledge and ideas.

The two main databases used in this book provide a useful contrast. Whereas one is at the spatially aggregated level, the other facilitates analysis at the firm level. Both perspectives are essential for making inferences about the relationship between entrepreneurship and economic growth. These two databases are the basis for subjecting each hypothesis to systematic econometric scrutiny. The empirical results emerging from chapters 4 through 9 are generally consistent with the posited hypotheses, albeit considerably more nuanced in some cases.

Based on this general empirical validation, we use the framework provided by the Knowledge Spillover Theory of Entrepreneurship to interpret the emergence of entrepreneurship policy in chapter 10. We discuss what constitutes entrepreneurship policy, the mandate for entrepreneurship policy, the rationale for entrepreneurship policy, as well as why it is diffusing across a broad spectrum of national, regional, and local contexts. It is not only beyond the scope of this book but also beyond the purpose to identify which specific policy instruments are more effective at promoting entrepreneurship. Rather, the goal of chapter 10 is to explain why entrepreneurship policy has emerged as a bona fide approach to promoting economic growth.

Finally, we present in the last chapter a summary and conclusions from the entire book. Both the theoretical framework and the ensuing empirical evidence dispel any conventional wisdom suggesting that entrepreneurship is peripheral to economic growth. Rather, the results of this study provide compelling systematic evidence pointing to the central role that entrepreneurship plays in generating economic growth. The broad public policy goal to create an entrepreneurial economy can be explained by the vital contribution that entrepreneurship makes as a conduit of knowledge spillovers. Entrepreneurship has emerged as the missing link in the process of economic growth.

The book concludes by suggesting that the Schumpeterian view of entrepreneurship as an agent triggering creative destruction may be less appropriate for the young century. Schumpeterian creative destruction has the newly created entrepreneurial firms displacing the old incumbent firms. Our view is that such displacement, at least in terms of employment, is triggered by opportunities created by globalization and foreign outsourcing. By contrast, endogenous entrepreneurship is a response to opportunities created by knowledge investments from incumbent organizations. Thus, knowledge-spillover entrepreneurship is not so much an agent of creative destruction but of *creative construction*—of new opportunities that might otherwise not have been pursued, at least at the particular

Standort. Entrepreneurship may be less of a threat to the status quo organizations and more of a solution to accruing a desperately needed social return on public investments in education, human capital, and research.

Hence, entrepreneurship may be less of an adversarial force than is implied in the Schumpeterian concept of creative destruction. Instead, it may embody a greater element of a social or public good. Perhaps the role of entrepreneurship as creative construction may explain the widespread public policy mandate to create an entrepreneurial economy. How and why such an entrepreneurial economy has emerged, at least in some contexts, and why creating one has become a desirable goal of public policy, is the topic of the following chapters.

2

The Emergence of the Entrepreneurial Economy

2.1 Small Has Become Beautiful Again

The role of entrepreneurship in the economy has changed drastically over the last half century. During the post—World War II era, the importance of entrepreneurship and small business seemed to fade. While some noted that small business needed to be preserved and protected for social and political reasons, few made the case on the grounds of economic efficiency. This thinking has changed in recent years. Entrepreneurship has come to be perceived as the engine of economic and social development throughout the world. For example, Romano Prodi, who at the time served as president of the European Commission, proclaimed that the promotion of entrepreneurship was a central cornerstone of European economic growth policy: “Our lacunae in the field of entrepreneurship need to be taken seriously because there is mounting evidence that the key to economic growth and productivity improvements lies in the entrepreneurial capacity of an economy” (2002, p. 1).

From the other side of the Atlantic, Mowery (2005, p. 1) observes,

During the 1990s, the era of the “New Economy,” numerous observers (including some who less than 10 years earlier had written off the U.S. economy as doomed to economic decline in the face of competition from such economic powerhouses as Japan) hailed the resurgent economy in the United States as an illustration of the power of high-technology entrepreneurship. The new firms that a decade earlier had been criticized by authorities such as the MIT Commission on Industrial Productivity (Dertouzes et al., 1989) for their failure to sustain competition against large non-U.S. firms, were now seen as important sources of economic dynamism and employment growth. Indeed, the transformation in U.S. economic performance between the 1980s and 1990s is only slightly less remarkable than the failure of most experts in academia, government, and industry, to predict it.

The purpose of this chapter is to explain how and why the economic role of entrepreneurship has changed so dramatically in the past half century. The

changing role of entrepreneurship reflects three views of the economy, which correspond to three historical periods: the first can be referred to as the Capital (or Solow) Economy, which corresponds very roughly to the early postwar era; the second can be referred to as the Knowledge (Romer) Economy, which roughly corresponds to the later postwar era (the 1980s); and the third can be referred to as the Entrepreneurial Economy, which may have its roots in the mid-1970s, but really took off in the 1990s.

The next section explains how the economic role of new startups and small business in the capital or Solow economy was generally viewed as imposing inefficiency on the economy. The third section explains how this marginal or negative role of new and small firms in the knowledge economy was actually reinforced. In section 4 we explain why only with the emergence of the entrepreneurial economy has the contribution of entrepreneurship to economic growth become widely recognized. Finally, in the last section, we provide a summary and conclusion. In particular, we propose a view in which the entrepreneurial economy can be defined as an economy where entrepreneurship plays a key role in generating economic growth.

2.2 The Capital (Solow) Economy

Economic growth has been a major preoccupation of economists, dating back at least to Adam Smith. William Stanley Jevons, for example, posited a growth theory based on the activity of sunspots. Robert Solow took a less exotic approach to explaining economic growth. Writing in the postwar era, Solow was awarded the Nobel Prize for his model of economic growth based on the neoclassical production function. In the Solow model two key factors of production—physical capital and (unskilled) labor—were econometrically linked to explain economic growth.

Solow, of course, acknowledged that technical change contributed to economic growth, but in terms of his formal model, it was considered an unexplained residual, which falls like manna from heaven. As Nelson (1981, p. 1030) points out, “Robert Solow’s 1956 theoretical article was largely addressed to the pessimism about full employment growth built into the Harrod-Domar model... . In that model he admitted the possibility of technological advance.”

Solow’s pathbreaking research inspired a subsequent generation of economists to rely on the model of the production function as a basis for explaining the determinants of economic growth. This approach generally consisted of relating measures representing these two fundamental factors of production, physical capital and unskilled labor, in trying to explain variations in growth rates typically over time in a single country or across countries in a cross-sectional context. The unexplained residual, which typically accounted for a large share of the (unexplained) variance in growth rates, was attributed to technological change. As Nelson concluded in his important review article in the *Journal of Economic Literature*, “Since the mid-1950s, considerable research has proceeded closely guided by the neoclassical formulation. Some of this work has been theoretical. Various forms of the production function have been invented. Models have been

developed which assume that technological advance must be embodied in new capital. . . . Much of the work has been empirical and guided by the growth accounting framework implicit in the neoclassical model” (p. 1032). In this growth accounting framework implicit in the neoclassical model, two factors, physical capital and labor, were econometrically linked to growth rates.

Growth policy, or economic policy for growth, if not shaped by the Solow theoretical growth model, certainly corresponded to the view that inducing investments in physical capital in particular was the key to generating economic growth and advances in worker productivity. Both the economics literature and the corresponding public policy discourse were decidedly focused on which instruments, such as monetary policy versus fiscal policy or interest rates versus capital depreciation allowances, were best suited to induce investment in physical capital and ultimately to promote growth. While these debates may never have been satisfactorily resolved, the tenacity of this view reflects the deep-seated belief about the primacy of capital investment as the fundamental source of economic growth.

Though economic growth policy seemingly fell squarely within the domain of macroeconomics, the primacy of capital as a factor of production had implications at the microeconomic level for the organization of the enterprise, the industry, and the market. Both theoretical arguments and empirical verification suggest that the organization of economic activity to efficiently use the factor of physical capital might not, in fact, be consistent with the assumptions needed for perfect competition and, therefore, economic welfare. In particular, capital seemed to be deployed most efficiently in large organizations capable of exhausting significant economies of scale, resulting in a concentrated industry or market, consisting of just a few main producers. The emergence and ascendancy of the applied field of industrial organization in economics reflected the importance of this concern.

During the postwar period a generation of scholars galvanized the field of industrial organization by developing a research agenda dedicated to identifying the issues involving this perceived trade-off between economic efficiency on the one hand and political and economic decentralization on the other (Scherer, 1970). Scholarship in the field of industrial organization generated a massive literature focusing on essentially three issues: (1) What are the gains to size and large-scale production? (2) What are the economic welfare implications of having an oligopolistic or concentrated market structure; that is, is economic performance promoted or reduced in an industry with just a handful of large-scale firms? (3) Given the overwhelming evidence that large-scale production resulting in economic concentration is associated with increased efficiency, what are the public policy implications?

A generation of scholars had arduously and systematically documented empirical evidence that supported the conclusion of Joseph A. Schumpeter (1942, p. 106): “What we have got to accept is that the large-scale establishment or unit of control has come to be the most powerful engine of progress and in particular of the long-run expansion of output.” John Kenneth Galbraith (1956, p. 86) provided a postwar interpretation: “There is no more pleasant fiction than that technological change is the product of the matchless ingenuity of the small man forced by competition to employ his wits to better his neighbor.”

The pervasive fear of the Soviet Union that emerged during the Cold War went beyond concerns about military competition and the space race. Many in the West worried that Sputnik's launch demonstrated the superior organization of Soviet industry. Facilitated by centralized planning, the Soviet economy apparently generated rates of growth greater than those of the West, threatening, ultimately, to “bury,” as Soviet Premier Nikita Khrushchev famously put it, the free market competition. After all, the nations of Eastern Europe, and the Soviet Union in particular, had a “luxury” inherent in their systems of centralized planning—a concentration of economic assets on a scale beyond anything imaginable in the West, where the commitment to democracy seemingly imposed a concomitant commitment to economic decentralization.

Western economists and policy-makers of the day were nearly unanimous in their acclaim for large-scale enterprises. It is no doubt an irony of history that this consensus mirrored a remarkably similar gigantism embedded in Soviet doctrine, fueled by the writings of Marx and ultimately implemented by Stalin's iron fist. This was the era of mass production when economies of scale seemed to be the decisive factor in determining efficiency. This was the world so colorfully described by John Kenneth Galbraith (1956) in his theory of countervailing power, in which big business was held in check by big labor and by big government. This was the era of the man in the gray flannel suit (Riesman, Denney, and Glazer, 1950) and the organization man (Whyte, 1960), when virtually every major social and economic institution acted to reinforce the stability and predictability needed for mass production (Chandler, 1977; Piore and Sabel, 1984).

With a decided focus on the role of large corporations, oligopoly, and economic concentration, the literature on industrial organization yielded a number of key insights concerning the efficiency and impact on economic performance associated with new and small firms:

1. *Small firms were generally less efficient than their larger counterparts.* Studies from the United States in the 1960s and 1970s revealed that small firms produced at lower levels of efficiency, leading Weiss (1976, p. 259) to conclude that “on the average, about half of total shipments in the industries covered are from suboptimal plants. The majority of plants in most industries are suboptimal in scale, and a very large percentage of output is from suboptimal plants.” Pratten (1971) found similar evidence for the United Kingdom, where suboptimal scale establishments accounted for 47.9 percent of industry shipments.
2. *Small firms provided lower levels of employee compensation.* Empirical evidence from both North America and Europe found a systematic and positive relationship between employee compensation and firm size (Brown and Medoff, 1989; Brown, Hamilton, and Medoff, 1990).
3. *Small firms were only marginally involved in innovative activity.* Based on R&D measures, small- and medium-size firms (SMEs) accounted for only a small amount of innovative activity (Scherer, 1970).
4. *The relative importance of small firms was declining over time in both North America and Europe.* A clear trend was identified toward an