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Entrepreneurship and Economic Performance: a Macro Perspective

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Abstract. The present paper provides a theoretical framework of the relationship between rate of entrepreneurship and national economic performance. The first part deals with some aspects of the recent economics literature on the relation between entrepreneurship and small business, on the one hand, and economic growth, on the other. In particular, it gives a summary of some work of the EIM/CASBEC research group in the Netherlands. In the second part a framework is presented linking entrepreneurship and growth at different levels of aggregation. The last part of the paper illustrates the framework with some historical case studies. The present paper supplements Wennekers, Uhlaner and Thurik (2002) which is concerned with the causes of the rate of entrepreneurship.

Keywords: entrepreneurship, small firms, market structure, growth, economic development, economic history

1. Introduction

Entrepreneurship and small business are related but not synonymous concepts. On the one hand, entrepreneurship is a type of behavior that concentrates on opportunities rather than resources (Stevenson and Gumpert, 1991). This type of behavior can happen in both small and large businesses but also elsewhere. On the other hand, small businesses can be a vehicle for both Schumpeterian

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entrepreneurs introducing new products and processes that change the industry and for people who simply run and own a business for a living (Wennekers and Thurik, 1999). The latter group includes many franchisees, shopkeepers and people in professional occupations. They belong to what Kirchhoff (1994) calls 'the economic core'. That both entrepreneurship and small businesses matter is not a new observation. In particular, they are important where they overlap. This is in the area of new, small, and sometimes fast growing businesses. However, the way in which they matter has evolved over time. During the first decades of the twentieth century, small businesses were both a vehicle for entrepreneurship and a source of employment and income. This is the era in which Schumpeter (1934) conceived his *Theory of Economic Development*, emphasizing the role of the entrepreneur as prime cause of economic development. He describes how the innovating entrepreneur challenges incumbent firms by introducing new inventions that make current technologies and products obsolete. This process of creative destruction is the main characteristic of what has been called the Schumpeter Mark I regime.

During the post-World War II years small business still mattered, but increasingly less on the grounds of economic efficiency, and more for social and political purposes such as employment, stability and provision of personal services. Immediately following WWII when large firms had not yet gained the powerful position of the 1960s and 1970s, small businesses were the main supplier of employment and hence of social and political stability. But as trends showed a shift toward larger firm employment, scholars, such as Chandler (1977) and Galbraith (1967) convinced economists, intellectuals and policy makers that the future was in the hands of large corporations; small business would fade away as the victim of its own inefficiencies. During the 1960s and 1970s, policy in the United States was divided between the choices of allowing the demise of small business on economic grounds versus preserving some semblance of a small-enterprise sector for social and political reasons. In choosing for the latter, policy-makers argued that small business was essential to maintaining American democracy in the Jeffersonian tradition. Even earlier, passage of the Robinson-Patman Act by the US Congress in 1936 to supplement the Clayton Antitrust Act (Foer, 2001; Bork, 1978) and creation of the United States Small Business Administration in 1953 were both policy responses to protect less-efficient small businesses and to maintain their viability. These policy responses are typical of what Schumpeter (1942) identifies as a Mark II regime, in which large firms outperform their smaller counterparts in the innovation and appropriation process through a strong positive feedback loop from innovation to increased research and development activities.

The purpose of the present paper is to outline the relationship between entrepreneurship and economic performance using a macro perspective. Whereas in an earlier paper, Wennekers, Uhlaner and Thurik (2002) address

the causes of variation in the rate of entrepreneurship across countries and across time, the primary aim of the present contribution is to identify the consequences of entrepreneurship. Carree and Thurik (2002) also provide an extensive literature survey of this area. Section 2 reviews changes in the world's economy since the 1970s and the consequences this change has had on economic policy. Furthermore, Section 2 reviews some recent research on the relationship between entrepreneurship and small business on the one hand and economic growth on the other. Section 3 provides a framework linking entrepreneurship and growth at different levels of aggregation focusing on the triangle restructuring, (new) structure and the process of variety and competition. Section 4 of the paper illustrates the framework with some historical case studies.

2. The Economics of the Consequences of Entrepreneurship

2.1. The Changing Role of Small Business Within the Economy

In today's world, both economists and policy makers increasingly see small businesses, particularly new ones,[2] as a vehicle for entrepreneurship, contributing not only to employment and social and political stability but also to innovation and competition (Wennekers and Thurik, 1999). This replaces the older view that small businesses should be maintained for social rather than economic reasons, even at a net economic cost. Recent empirical evidence reinforces this view. Research across a wide spectrum of units of observation, spanning the establishment, the enterprise, the industry, the region, and the country, verifies the positive and statistically robust link between entrepreneurship and economic growth with a lack of entrepreneurship incurring a cost in terms of forgone economic growth (Audretsch and Thurik, 2000; Audretsch, Carree, van Stel and Thurik, 2002; Carree and Thurik, 1999; Carree, van Stel, Thurik and Wennekers, 2002; Audretsch, Carree and Thurik, 2001).

In short, while small business has always mattered to policy makers, the way in which it has mattered has changed dramatically. Confronted with rising concerns about unemployment, job creation, economic growth and international competitiveness in global markets, policy makers have responded to new research evidence with a new mandate to promote the creation of new

2. For instance, in his speech « For a new European entrepreneurship » to the Instituto de Empresa, (Madrid, 7 February 2002) Romano Prodi, President of the European Commission, said: "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."

businesses, i.e., entrepreneurship (Reynolds, Hay, Bygrave, Camp and Autio, 2000). This trend is fairly recent. Whereas in the late 1980s, European policy makers were relatively slow to recognize these links, since the mid-1990s, European policymakers have rapidly built momentum in crafting general intuitive approaches (EIM/ENSR, 1993, 1994, 1995, 1996, 1997; Audretsch, Thurik, Verheul and Wennekers, 2002). Yet, without a clear and organized view of where and how entrepreneurship manifests itself, policy makers are left in unchartered waters without an analytical "compass". Perhaps, this explains the wide variation in their responses (European Commission, 2000 and 2001). For the evaluation of these responses an understanding of the mechanisms by which entrepreneurship impacts economic performance is needed since this may guide more appropriate responses in the future.

2.2. Evidence of the Change

The shift in policy regarding small business and entrepreneurship was coupled with a shift in economic activity from large firms to small firms in the 1970s and 1980s in the U.S. and in the 1980s and 1990s in Europe. The most impressive and also the most cited is the share of the 500 largest American firms, the so-called *Fortune 500*. Their employment share dropped from 20% in 1970 to 8.5% in 1996 (Carlsson, 1992 and 1999). Though the drop in the large firm employment share does not necessarily imply an increase in that of small firms, indeed the share of entrepreneurship in the US labor force increased from 8% in 1972 to nearly 11% in 1988, remaining practically constant afterwards (Wennekers, Uhlaner, and Thurik, 2002). Furthermore, a study of 23 OECD countries in the period 1974-1998 shows that across the entire sample of nations, the number of business owners grew from about 29 million in 1972 to about 45 million in 1998 (Wennekers, Uhlaner, and Thurik, 2002). In spite of clear evidence of a shift toward more widespread ownership and, concurrently, of a shift toward a larger number of smaller firms, this data also reveals considerable disparity in business ownership rates across countries and over time (Audretsch and Thurik, 2000 and Audretsch, Thurik, Verheul and Wennekers, 2002; Wennekers, Uhlaner and Thurik, 2002). Some countries, including Denmark, France, Luxembourg and Norway, even suffered a steady decline in the business ownership rate during the period under study. Finally, although Japan only had a decline in business ownership in the second period (1984-1998), this decline is particularly noteworthy since its share in total business owners dropped from more than 20% in 1972 to 15% in 1998. This data is presented and discussed in detail in our previous paper (Wennekers, Uhlaner, and Thurik, 2002). In fact, it is precisely this variation across countries what allows us to ask the central question of the present paper:

do varying rates of entrepreneurship across countries affect economic performance and if so, why?

2.3. Causes of the Change

Many of the major causes of the shift toward expanded entrepreneurship are discussed by Wennekers, Uhlaner, and Thurik (2002) and thus will not be repeated in detail. At the aggregate level, technology, level of economic development, demographic characteristics, culture and institutions all play a role in determining the opportunities (on the demand side), and the capabilities and preferences (on the supply side) that plant the seeds of nascent entrepreneurship. Wennekers, Uhlaner and Thurik (2002) further elaborate the manner in which nascent entrepreneurship, start-ups and exits combine to establish the actual rate of business ownership in a particular economy. This is further complicated by the notion that the actual rate is a fluctuation of an underlying equilibrium rate of entrepreneurship within a particular economy. Rather than repeat these arguments here, the reader is urged to refer to our earlier paper. Other sources documenting the industrial changes and their causes are Piore and Sabel (1984), Brock and Evans (1989), Loveman and Sengenberger (1991), Carlsson (1992), Acs, Carlsson and Karlsson (1999), Audretsch and Thurik (2000) and Carree, van Stel, Thurik and Wennekers (2002).

2.4. The Consequences of Entrepreneurship

What then are the consequences of the shift toward smallness? The relationship between growth and entrepreneurship at the macro level is a complicated one. In the past, macro-economic models have assumed a two-way causation between changes in the level of entrepreneurship and that of the level of economic development: a "Schumpeter" effect of rate of entrepreneurship enhancing economic growth and a "refugee" or "shopkeeper" effect of low growth levels stimulating self-employment. Audretsch, Carree and Thurik (2001) try to reconcile the ambiguities found in the relationship between unemployment – as the inverse of economic growth - and entrepreneurship. This two-way causation between unemployment and entrepreneurship finds its origins in various parts of the economics literature. On the one hand, the simple theory of occupational choice, which has been the basis for numerous studies focusing on the decision confronted by individuals to start a firm and become an entrepreneur suggests that increased unemployment will lead to an increase in startup activity on the grounds that the opportunity cost of starting a firm has decreased. On the other hand, the

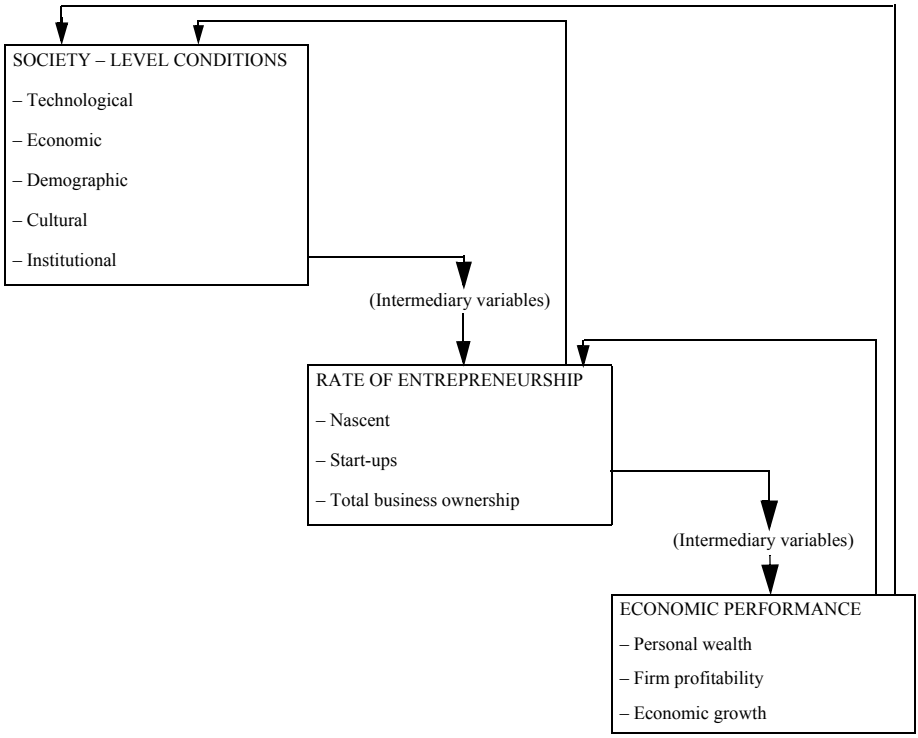
unemployed tend to possess lower endowments of human capital and entrepreneurial talent required to start and sustain a new firm, suggesting that high unemployment is associated with a low degree of entrepreneurial activities. A low rate of entrepreneurship may also be a consequence of low economic growth levels, which also reflect higher levels of unemployment. Entrepreneurial opportunities are not just the result of the push effect of (the threat of) unemployment but also of the pull effect produced by a thriving economy as well as by entrepreneurial activities in the past. In addition to unemployment leading to more or less entrepreneurial activity, the reverse has also been claimed to hold. On the one hand, new-firm startups hire employees, resulting in subsequent decreases in unemployment. On the other hand, the low rates of survival combined with the limited growth of the majority of small firms imply that the employment contribution of startups is limited at best, which would argue against entrepreneurial activities reducing unemployment.

Reynolds, Hay, Bygrave, Camp and Autio (2000) take a more direct approach by correlating growth and entrepreneurial activity. The latter approach is simpler in a methodological sense but more sophisticated in that a wider variety of countries is observed and that entrepreneurial activities are measured appropriately. Despite their entirely different approaches both studies show a positive correlation between entrepreneurship and economic growth. Carree and Thurik (2002) cite other studies in their survey of the literature on the role of entrepreneurship in economic growth. Briefly summarizing their conclusions, by and large, research to date suggests that entrepreneurship contributes to economic growth irrespective of how entrepreneurship is measured, which level of aggregation is observed and/or which model is used. However, our knowledge of the drivers, i.e. the intermediate linkages between entrepreneurship and economic performance is weak. We return to this theme in the next section, where we suggest what some of the linkages may be.

3. A Framework Linking Entrepreneurship and Economic Performance

Wennekers, Uhlaner and Thurik (2002) provide a framework of entrepreneurial behavior that addresses both the determinants and consequences of entrepreneurship at the macro-level of analysis (See Figure 1). Their paper focuses primarily on the left-hand portion of the framework: explaining how the various determinants of entrepreneurship, including technology, level of economic development, demography, culture and institutions, exert their influence on nascent entrepreneurship by way of individual occupational choice. Subsequently, their paper provides insight into how nascent entrepreneurship influences the actual rate of business ownership at the aggregate level of analysis, considering various intermediary and conditional variables.

Figure 1: A Framework of Entrepreneurial Behavior

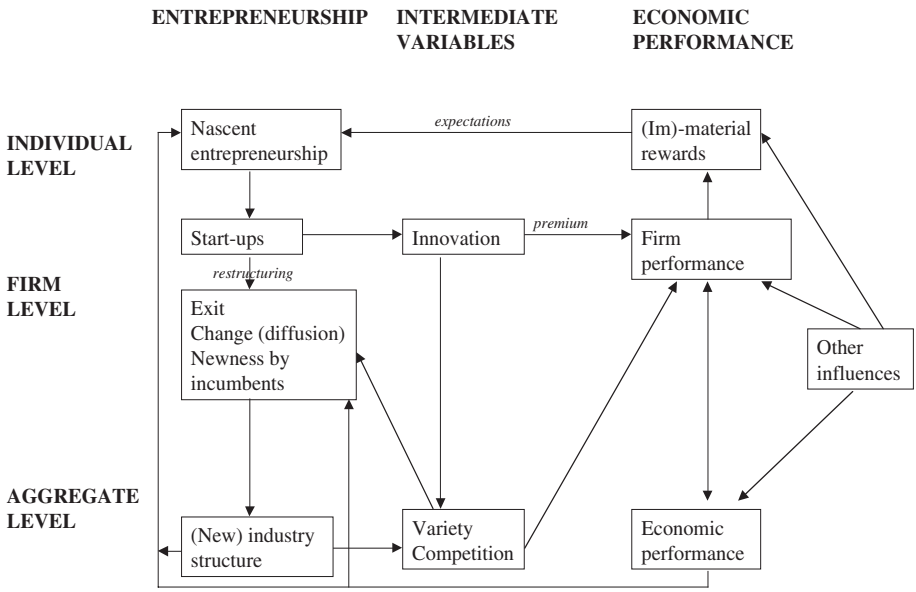


The present paper concentrates on the right-hand portion of the framework: in particular, the relationship between different aspects of entrepreneurial behavior (i.e. nascent entrepreneurship, start-ups, and total business ownership) and economic performance at the individual, firm and macro levels. (See Figure 2).

3.1. Nascent Entrepreneurship: the Starting Point

Our discussion of the framework starts from the phenomenon of nascent entrepreneurship, as indicated in the upper left corner of Figure 2. Nascent entrepreneurs are individuals (such as wage earners, unemployed, students and homemakers) who intend and/or actively try to start a new business. Nascent entrepreneurship stands for untapped 'entrepreneurial energy outside the market'. Only a certain proportion of nascent entrepreneurs succeeds in getting a new business up and running. This proportion is represented in our model by the variable, start-ups, which in our model is treated as a firm-level variable. Start-ups represent the firms that enter the market. They affect the level of innovation found at the firm level of analysis. A substantial proportion of

Figure 2: Entrepreneurship and Economic Performance



(though not all) new firms foster innovation by introducing new products or by finding new ways of producing and/or delivering an existing good or service. This influence is most directly operational at the firm level (as noted by the arrow between innovation and firm performance in Figure 2).

Second, start-ups trigger a restructuring of the economy through a wide array of adaptive reactions including, ultimately, business exits, mergers, re-engineering (diffusion), and new innovations by incumbents. The decisions leading to these reactions are made at the firm level, but their accumulated effects influence the aggregate level as well. In particular, the accumulated effects of these start-ups, exits and mergers change industry structure in terms of the number of businesses (the rate of business ownership) and the firm size distribution of firms.[3] This restructuring takes place at the aggregate levels of sectors, regions and national economies. The (new) industry structure resulting from start-up behavior and decisions taken by the incumbent firms and the innovations brought forward by new firms are also crucial inputs for a (new)

3. Age is also an interesting aspect of industry structure influenced by new firm start-ups. Based upon an extensive investigation into company histories of many of the world's major firms of the past century, Jovanovic and Rousseau (2001, p. 14) conclude: "New technologies and products are usually brought in by young companies and this means that – with some delay – when a new technology comes to market, [the average age of] an economy's leading firms tend[s] to get younger". We will not go deeper into the meaning of age for our framework.

round of variety and competition at the aggregate level. New industrial constellations lead to new forms of static as well as dynamic competition, in particular when new products or processes become manifest (innovation). Therefore in Figure 2 arrows are drawn from both (new) structure and innovation to the process of variety and competition. The static competition depends upon number and size class distribution of firms whereas dynamic competition arises from the variety of products and processes. This variety and competition, in turn, has an effect on the process of restructuring through selection of the most viable firms and the best ideas. In other words, firms are inclined or forced to react to their competitive environment with decisions about exiting, changing or introducing newness. Therefore in Figure 2 an arrow is drawn between the process of variety and competition and that of restructuring. Both the (new) industry structure and the variety and competition process directly or indirectly provide new impulses to nascent entrepreneurship, via second attempts of failed entrepreneurs, via spin-offs from incumbent firms and via new (inexperienced) start-ups following successful examples of entrepreneurship. The indirect impulses of variety and competition on nascent entrepreneurship are rather complex, traveling via the path to firm performance, individual rewards and the expectations of these actual rewards for nascent entrepreneurs. These impulses will be explained below.

3.2. Economic Performance in the Framework

Figure 2 also considers the direct and indirect effects of (new) entrepreneurial decision making on firm performance. Firm performance is influenced in three *direct* ways. First, the variety and competition process resulting from increased start-ups and restructuring of the economy manifests itself as an effect on firm performance. Second, in the short run, innovation often brings a premium to the innovator, in terms of higher growth of sales or higher business profitability (and thus also influencing firm performance). Third, economic performance at the aggregate level itself influences firm performance by creating or destroying opportunities for improved performance at the firm level. A strong economy not only provides a richer resource base for starting and expanding firms but also, ceteris paribus, for high performance. Conversely, an economy (or sector) in recession, will have a generalized dampening effect on individual firm performance. And, of course, the accumulated results of firm performance affects economic performance at the aggregate level. Therefore, the diagram shown in Figure 2 reveals a two-way arrow between firm performance and economic performance.

Figure 2 also shows a relationship between firm performance and the rewards entrepreneurs receive as a result of managing and owning their own

businesses. Further such rewards—both material and immaterial—can be shared with the wage earners employed. These rewards can include, for instance, not only growth of personal wealth but also self-realization or sense of achievement for their accomplishments. Figure 2 indicates that *other influences* may directly affect such rewards. These *other influences* may include the taxation and inheritance laws affecting the amount of profits entrepreneurs are entitled to keep.

Of course, exogenous factors may also influence economic growth and firm performance in addition to the endogenous factors indicated in Figure 2. Three important examples are the characteristics of consumer preferences, the growth of scientific knowledge and the invention of new radical technologies. A fourth one consists of deviations between the "optimal industrial" structure and the current one. We will discuss this fourth example below in section 4.2.3.

3.3. Preliminary Assessment of the Framework

Summarizing, our framework discusses several links leading from nascent entrepreneurship to firm performance, economic growth at the macro level as well as material and immaterial rewards at the individual level. Finally, the outcome of these dynamic processes depends also on a set of societal conditions discussed in an earlier article in this journal (Wennekers, Uhlaner and Thurik, 2002). It is likely that there are more feedbacks than those mentioned. Competition and selection in a world of variety enable individuals and firms to learn from both their own and other's successes and failures.[4] Role models implant expectations in future nascent entrepreneurs, while learning processes help individuals to improve their skills and adapt their attitudes. Also, but not explicitly shown in Figure 2, deviations from the "optimal" industrial structure as perceived by policy makers, induce political debate leading to the introduction of new policies and the revision of existing institutions. The outcome of all these so-called "spillovers" may be new entrepreneurial actions, creating a recurrent chain of linkages. Figure 2 must be interpreted as a highly stylized first attempt to describe the links between entrepreneurship and economic performance integrating various aggregation levels. Also, its emphasis on the role of the triangle of restructuring, (new) structure and variety and competition leaves room for alternative points of view. For instance, (new) entrepreneurs may also contribute to economic development by working longer and harder than similarly educated employees.

4. Also see Dosi (1988a, p. 235).

4. Historical Case Studies

The framework of entrepreneurial behavior and economic development provides a tool for analysis of the long-term economic performance of national economies, and particularly of the rise and decline of nations. In this section we take a closer look at the second industrial revolution -- driven by the implementation of electricity and combustion -- in the turn-of-the-nineteenth-century United States, and the partly overlapping managerial revolution leading to the age of giant corporations during the years 1930-1970. Second, we examine the modern knowledge economy of the late 20th and early 21st century.

4.1. The Second Industrial and Managerial Revolutions

The Second Industrial Revolution (Landes, 1969, p. 4; Atkeson and Kehoe, 2001, p. 1), driven by inventions such as electricity and the internal combustion engine, was a highly entrepreneurial period in economic history. This revolution was most conspicuous in the United States, although several European countries, notably Germany, also produced many innovations in this period (Landes, 1969, p. 352). The Second Industrial Revolution, while basically concentrated between 1860 and the early 1900s, gave rise to innovations in all walks of life, both in the US and in Europe, over an even longer period of time (Atkeson and Kehoe, 2001, p. 1). We will briefly touch upon this episode, as well as the Managerial Revolution, which began a few decades later and carried into a period ending roughly in 1970 (Chandler, 1977).

The growth in scale economies and the managerial revolution that took place in the decades preceding 1970 were forces that pushed the rate of business ownership downward, suppressing entry of new businesses and other entrepreneurial ventures. In spite of these forces, the economic success of this interim period can however be traced back to individual entrepreneurs. In support of this point, Purrington and Bettcher (2001) tracked the entrepreneurial roots of America's largest corporations at the close of the twentieth century. In particular, they found that out of the *Fortune 200* companies listed in 1997, 197 were either directly (101) or indirectly (96) tracked back to one or more entrepreneurial founders.

The speed of scientific discoveries, technical inventions and ensuing innovations during the second half of the 19th century was remarkable, rivaling or possibly even surpassing that of the so-called "new" economy of the late twentieth century. A sampling of the innovations put to market between 1851 and 1910, and predominantly still in use in the early 21st century, include automobiles, airplanes, telephones, photography, the cinema, the typewriter,

electric light, the refrigerator and many other electrical household appliances, aspirin, vaccines, plastics, the safety pin, the zipper, jeans, and toilet paper.[5] One source of dissemination somewhat unique to that period was the popularity of world exhibitions in both America and Europe. In a period where international communication was still quite primitive by today's standards, these international fairs played an extremely important role in the diffusion and adoption of new innovations. Later, photography and other newer technologies reduced the need for physical display of wares. Also, these fairs came into being at a time of relative calm and political stability among different nation-states.

The late 19th and early 20th century was also a period of high entry rates of new businesses. Many of the companies to dominate commerce for the majority of the twentieth century, such as General Electric, American Telephone and Telegraph (AT&T), General Motors and Boeing, were new entrants to business during this period, becoming listed on the stock market rather quickly upon their initial founding and creating lasting value (Jovanovic and Rousseau, 2001). We conjecture that these were among the firms, also including 'new' German brands[6] such as Siemens (1847), Bayer (1863), Agfa (1873) and Opel (1898), that may have inspired Schumpeter to develop his *Theory of Economic Development* (Schumpeter, 1934), emphasizing the role of the entrepreneur as prime cause of economic development, challenging incumbent firms by introducing new inventions that make current technologies and products obsolete. This process of 'creative destruction' is the main characteristic of the Schumpeter Mark I regime referred to previously.

For the champions of the Second Industrial Revolution, notably the US and Germany, this period was also an era of relatively high economic growth rates. According to Maddison (2001, p. 185, 186), GDP per capita growth between 1870 and 1913 averaged 1.8% per annum in the US. The average economic growth rate in Germany was 1.6%, while the leader of the First Industrial Revolution, the UK, achieved no better than 1.0% per annum. In The Netherlands, the technological frontier of Europe in the 17th century and the richest country of the western world until the early 1800s, economic growth between 1870-1913 did not exceed 0.9%.

At the same time, the evolving separation of business ownership and management roles in the late 19th and early 20th century is a hallmark of the onset of the Managerial Revolution (Chandler, 1977). The introduction of the limited and/or listed company facilitated the development of this separation of roles between ownership and management, first by the railroad and telegraphs

5. For a more complete overview of the many innovations of this period, the reader is referred to the catalogue of the exposition "La belle Europe; le temps des expositions universelles 1851-1913", Musées Royaux d'Art et d'Histoire, Brussels 26 October 2001 – 17 March 2002.
6. Again the reader is referred to the catalogue of "La belle Europe; le temps des expositions universelles 1851-1913", mentioned before.

industries and later mimicked by a broad range of other sectors including the automobile industry, retailing, and insurance. These changes were also coincident with a giant leap in business scale, the onset of multi-unit firms and the creation of managerial hierarchies. Though reaching a mature stage as early as 1910, the Managerial Revolution continued until roughly around 1970 (Chandler, 1977).

The continued decline of business ownership rate during this period is also attributed to the Managerial Revolution (Phillips, 1962). The scale achieved by many of the early entrants also helped these companies to ride out the Great Depression of the 1930's. For decades following the Great Depression, few firms entered the stock market, exceptions being mature firms, such as Proctor and Gamble and Pfizer that had been founded in the previous century. "Accordingly, the largest firms, which in the vast majority of cases were able to ride out the Depression, remained large" (Jovanovic and Rousseau, 2001, p. 15).

In sum, the years before 1910 are characterized as a classical entrepreneurial period with many new radical inventions and high business entry rates (Schumpeter Mark I), while scale economies gradually began to manifest themselves. The decades after 1910 were increasingly committed to technology *diffusion*, a period of about 70 years of ongoing, rapid technical change and accelerated growth in productivity (Atkeson and Kehoe, 2001, p. 1). The high economic growth rates of the 1950s and 1960s seem to be more the result of the spread of the managerial revolution, investments in new capital intensive industrial plants and large firm R&D (the so-called Schumpeter Mark II regime as foresaid in Schumpeter, 1942), rather than of new entrepreneurial formation.

Applying our framework to the period 1860-1970 we see that the triangle of restructuring, new structure and variety is particularly relevant for the decades before 1900 showing the onset of many new industries, resulting in a large wave of new and small firms consistent with the early stage of their product life cycle. The framework seems less applicable to the 1930-1970 years dominated by scale economies and stable technological trajectories giving rise to a relatively large firm-based industrial structure. This latter period is also quite distinct from the late 1970s and the 1980s, during which a more entrepreneurial economy would re-emerge. In the decades before 1900 start-up activity and innovation behavior dominated the explanation of growing economic performance.

4.2. The Knowledge Economy (1975 - ???)

Our second case example is drawn from the most recent economic period. Since the early 1970s many developed economies, beginning with the United States, have witnessed the revival of business ownership and the upsurge of

new business start-ups. This section explores how our framework as presented in Figure 2 might be helpful in explaining some consequences of this most recent resurgence in entrepreneurial activity, as well as the large variation that persists across countries.

4.2.1. Global Trends in the Business Environment

In the modern economy, knowledge has replaced raw materials and physical labor as the key resource (Drucker, 2001), thus earning the present era the label of the *knowledge economy* (Audretsch and Thurik, 2000). New information technologies, especially the Internet, allow knowledge to spread quickly, available to anyone with computer access and telephone connections. These new technologies have led to an information technology (IT) revolution characterized by Jovanovic and Rousseau as the "second democratization of knowledge", the first one being the invention of the printing press in the 15th century (Jovanovic and Rousseau, 2001, p. 22).

One can draw parallels between the Second Industrial Revolution and the present IT revolution. One obvious parallel is the young age of IT entrants on the stock market and the related wave of new products, new firms, and faster productivity growth worldwide than witnessed in the middle part of the 20th century" (Jovanovic and Rousseau, 2001, p. 17). Secondly, governments at both the country and at the supranational level are increasingly being tuned towards fostering entrepreneurship (Stevenson and Lundström, 2001; Audretsch et al., 2002; OECD, 1998; European Commission, 1999). Various nations have instituted labor and capital market reforms, reduction of regulatory and administrative barriers for business start-ups, new competition policies, specific programs and services in support of new and small firms, promotion of entrepreneurship and an increasing attention for entrepreneurship at all levels of the educational system.

The advent of knowledge as a prime input factor weakened incumbent firms depending on more traditional inputs and led to increased start-up activity and innovation behavior. This again led to strong movements in the triangle of restructuring, structure and variety and competition as depicted in Figure 2.

4.2.2. Contemporary Institutional Differences Across Nations

Our earlier analysis[7] of the first part of our framework in Figure 1 suggests that the variation in business ownership across countries partly stems from differences in the level of economic development. Up to a certain stage of

7. For a detailed elaboration of our framework on the causes of entrepreneurship the reader is referred to our article in Wennekers, Uhlaner and Thurik (2002).

economic development more prosperous countries have relatively fewer business owners and a relatively greater large firms sector. Beyond this stage of development a reversal of the declining business ownership rate was seen to occur in several of the economically most advanced nations. Additionally, and partly unrelated to the stage of development, historically rooted cultural and institutional differences contribute to the variation in business ownership.

A brief comparison of the cultural and institutional conditions for entrepreneurship in France with those in the US, further illustrates how our framework of economic performance in figure 2 is embedded in the overall framework of entrepreneurial behaviour in figure 1.[8] Both France and the U.S. rank among the most advanced nations of the world, economically and technically speaking. However, they differ conspicuously with respect to rate of business ownership. Over the last three decades of the twentieth century, France declined in business ownership to an all-time low level of 8.5% in 1998. By contrast, the U.S. rebounded in its rate of business ownership to a rate above 10% of its labor force over the same period. This net gain in ownership masks an even more vibrant entrepreneurial economy: the U.S. economy can be described as turbulent, as reflected in unusually high entry and exit rates, a high prevalence of rapid growth firms, and innovative entrepreneurship, with respect to advanced technologies.

Cultural and institutional differences between these two countries may help to explain theses sharp differences in entrepreneurship rates. For instance, Hofstede's research characterizes French culture as having a high degree of uncertainty avoidance and power distance (Wennekers, Uhlaner and Thurik, 2002). Its institutions also reflect strict government regulations, centralized planning and control. Management positions are often assigned to former students of the elite schools, the so-called *Grandes Écoles*. The French educational system restricts its attention for entrepreneurship to universities and colleges, most prominently in business schools. Labor market flexibility is traditionally limited, causing high opportunity costs of entrepreneurship and restricting the room for business owners to adjust their workforce to market demand. Relative to the United States, France can also be seen as a more centrally-managed economy. It has a centuries-long history of strong government intervention in industrial development. Innovation is strongly dependent upon the government, which is inclined to assign technological projects to large firms. Within technological clusters large firms are often aloof to their immediate environment, thereby inhibiting "technological cross-fertilization". By contrast, the U.S. culture has often been described as supportive of entrepreneurship. Using Hofstede's dimensions, it is characterized by a low rate of uncertainty avoidance. Furthermore, its culture

8. This section is based upon chapters 3 and 6 of Audretsch, Thurik, Verheul and Wennekers (2002).

traditionally attaches a high value to self-reliance. Starting a business is easy and considered 'normal'. The social stigma of failure is relatively low. Its institutions also support entrepreneurship. The venture capital market is well developed, the labor market is flexible and intellectual property rights are relatively well protected. Finally, knowledge spills over rather smoothly from universities and large corporations to small and new firms through spin-offs, incubator centers, and rules that often encourage or at least allow for the sharing of information.

4.2.3. Economic Effects of Business Ownership and the Concept of "Disequilibrium"

Business ownership declined over a long time span, clearly documented from at least the late nineteenth century until approximately the 1970s (Wennekers, Uhlaner, and Thurik, 2002). The reversal of the downward trend in business ownership rates since the early 1970s gives rise to the idea that a U-shaped relationship exists between rates of business ownership and economic development. Economists partly explain this reversal as the result of the information communications technology (ICT) revolution, which significantly altered the transaction costs of doing business, leveling the playing field between large and small firms (Wennekers, Uhlaner and Thurik, 2002). However, this technology shift alone cannot sufficiently explain why the extent and timing of this shift varies so much across countries (Brock and Evans, 1989). Thus, a further explanation must take into account the differences in institutions and policies across countries that facilitated a greater and more rapid response to globalization and technological change, along with the other underlying factors, by shifting to a less centralized industry structure in some countries than has been the case in other countries (Audretsch, Thurik, Verheul and Wennekers, 2002). An implication of this high variance in industry restructuring is that some countries are likely to have industry structures that are different from "equilibrium" or "optimal" rate.

Many forces may cause the actual number of business owners to deviate from the "equilibrium" rate.[9] Such a "disequilibium" may result from cultural forces, institutional settings (regulation of entry, incentive structures, functioning of the capital market) and economic forces (unemployment, profitability of private enterprise). A "disequilibrium" may also result from

9. As the business ownership rate is by definition inversely related to average firm size, it is straightforward that the "equilibrium" rate may be inversely related to (the development of) scale economies in the various lines of business, and to their relative proportions. At the supply side of business ownership the equilibrium rate is also influenced by real wages, representing the opportunity costs of entrepreneurship (Lucas, 1978). For a generalization see de Wit and Van Winden (1991).

overshooting. This overshooting may have occurred in the last declining stage of business ownership rates, as the upsizing of the business sector and the development of relevant institutions (labor market regulation, social security, tax system, educational system) have symbiotically reinforced each other during the greater part of the last century. During the 1950s and 1960s the actual business ownership rate in many countries may well have decreased to a level below the underlying equilibrium rate. There are several forces in market economies that contribute to a process of adapting towards the equilibrium. An example may illustrate this. A high labor income share and a structurally low number of enterprises contributed to structural unemployment in the late 1970s and 1980s in many Western economies. Such high levels of unemployment may have various consequences. First, unemployment may have a direct effect on self-employment, as unemployed are claimed to be more likely to become self-employed than employees. Second, structural unemployment gradually results in wage moderation helping to restore profitability of private enterprise (lower labor income share). In addition, a perceived shortage of business ownership will induce policies fostering entrepreneurship, ranging from better access to financing to competition policies (OECD, 1998).

Explanations for economic growth have in recent decades generally been restricted to the realm of macroeconomics. However, a different scholarly tradition links growth to industrial organization (Schumpeter, 1934). According to this tradition, performance, measured in terms of economic growth, depends upon the degree to which the industry structure most efficiently utilizes scarce resources. But what determines this 'optimal' structure? There is a long-standing tradition in the field of industrial organization devoted towards identifying the determinants of industry structure, in particular technology. Chandler (1990), for instance, expands the determinants of optimal industry structure to include other factors next to underlying technology. Dosi (1988b, p. 1157) concludes that "Each production activity is characterized by a particular distribution of firms." When the determinants of the underlying industrial structure are stable, the industry structure itself would not be expected to change. However, a change in the underlying determinants would be expected to result in a change in the "optimal" industry structure. An extensive literature has linked the structure of industries to performance. However, little is known about the consequences of deviating from the "optimal" industry structure. The evidence provided in Audretsch, Carree, van Stel and Thurik (2002) shows that, in fact, there is a cost of not adjusting industry structure towards the "optimal". They define structure in terms of the small business share or the relative number of entrepreneurs and measure costs in terms of forgone economic growth. Since deviations are inevitable due to regulations, scarce input factors, or failing markets, the existence of growth penalties is a relevant phenomenon.

Therefore, these deviations, though not explicitly indicated in Figure 2, are subsumed under the heading of *other influences*.

4.2.4. Empirical Evidence on the Role of Entry and Exit

In recent years some research has been carried out into the relationship between dynamic proxies of entrepreneurship and economic performance. Bosma and Nieuwenhuijsen (2000) studied the impact of firm dynamics on productivity growth in the Netherlands. Their model is based upon a production function framework in which turbulence (the sum of entry and exit as a percentage of the number of incumbent businesses) is incorporated as an additional explanatory variable. Using data for a panel of 40 Dutch regions in the period 1988-1996, they estimate their model for services and manufacturing separately. For the services sector they find a significant and positive influence of lagged turbulence on (total factor) productivity growth. For manufacturing no impact was found.

Audretsch and Frisch (2002), investigate the differences in employment growth rates between 74 West-German regions in the 1980s and 1990s. They distinguish between four growth regimes: the entrepreneurial regime (high start-up rate and high employment growth rate), routinized regime (low start-up rate with high growth rate), revolving door regime (high start-up rate with low growth rate) and the declining or downsizing regime (low start-up rate and low growth rate). When comparing the 1980s and the 1990s they find some striking results. First, regions with revolving door regimes in the 1980s often become entrepreneurial in the 1990s. Second, none of the regions with a routinized regime in the 1980s became entrepreneurial in the 1990s, but many entered the downsizing category. Third, the majority of the regions that were in the entrepreneurial or the downsizing category in the 1980s were of the same type in the 1990s. Finally, when regressing employment change across regions, they find a significant positive influence of high start-up rates in the 1980s on employment change in the 1990s. Audretsch and Fritsch (2002) conclude: 'Small firms and new firm start-ups may not be necessary for regional growth in the short run, but perhaps they are the seeds of future growth and are of central importance for long run economic development'. A similar investigation concerning business start-ups and employment growth in 60 regions of Great Britain confirms these results (van Stel and Storey, 2002).

This and similar research is an example of the influence of the triangle of restructuring, structure and variety and competition on firm performance (Figure 2).

4.2.5. Further Evidence Regarding the Relationship Between Entrepreneurship and Innovation

Small businesses serve as a vehicle for entrepreneurship. In addition, Acs (1992) suggests that small firms also play an important role as a source of innovative activity, as a stimulus for industry evolution and as a source of new jobs. Acs and Audretsch (1990) are the first to extensively investigate the role of smallness in the process of innovation. They found that, contrary to what was generally believed, industries with a large amount of small firms also have an inclination for innovation. Prior to their investigations it was generally thought that large (monopolistic) firms with large laboratories were the main source of economic progress (Chandler, 1977; Galbraith, 1967). As noted in the framework, start-up activity is assumed to be an engine for structural change across different industries and the economy at large. Audretsch (1995) provides examples within the American manufacturing sector. Cohen and Klepper (1992) focus on the impact of the number of firms on variety of the population of firms while this variety is a mechanism for progress: firms as well as consumers tend to reconsider their behavior in the face of alternatives. Baumol (1990) hypothesizes that while the total supply of entrepreneurs varies among societies, the productive contribution of their activities varies much more because of their allocation between productive activities such as innovation and largely unproductive activities such as rent-seeking or organized crime (Baumol, 1990, p. 894). Burke, Fitzroy and Nolan (2000) point at the fundamental difference between factors affecting the number of self-employed and their performance, i.e., between quantity and quality. Their study supports the view that an economy containing more small firms is not necessarily one with a more highly-performing, small-firm sector. For instance, a highly educated work force may produce a smaller total number of successful start-ups but a higher absolute number of highly performing ones. See also Carree and Thurik (2002) for a extensive literature survey of the entire area of entrepreneurship and economic growth.

5. Summary and Conclusions

We concur with the conclusion reached in a recent report that "…remarkably little is known about the relationship between entrepreneurship and economic growth, including how it works, what determines its strength and the extent to which it holds for diverse countries" (Reynolds, Hay, Bygrave, Camp and Autio, 2000, p.11). This lack of information points toward the importance of initiatives such as the EIM/CASBEC research program and the Global Entrepreneurship Monitor in supporting the policy debate to focus more and more on the role of entrepreneurship for economic growth. The richness of the

newly arising data material in terms of the variety of countries, the variety with which entrepreneurship can be measured and the large amount of explanatory variables will in due time provide policy makers with indispensable insight in macroeconomic policies and instruments needed to foster solid economic growth.

The present paper attempts to outline the relationship between entrepreneurship and economic performance using a macro perspective: the aim of the present contribution is to identify the consequences of entrepreneurship. It reviews some recent research on the relationship between entrepreneurship and small business on the one hand and economic growth on the other. It provides a tentative framework linking entrepreneurship and growth at different levels of aggregation while it also presents some historical case studies.

Entrepreneurship has played a vital role both in the take-off stages of the European economy and during the First Industrial Revolution.[10] Entrepreneurial formation also played a crucial role during the Second Industrial Revolution. But the growth in scale economies and the managerial revolution that took place in the decades preceding 1970 were forces that not only pushed the rate of business ownership downward, but also suppressed entry of new businesses and other entrepreneurial ventures. In spite of these forces, the economic success of this interim period can however be traced back to individual entrepreneurs of an earlier period.

Finally, the present era is sometimes designated as that of the knowledge economy or the third industrial revolution. From the empirical evidence of increasing new business formation and total business ownership in recent decades, and from econometric analysis of these data, it can be concluded that entrepreneurial formation seems to be regaining the economic relevance of previous industrial revolutions.

We conclude that our framework of the consequences of entrepreneurship seems to be applicable, although apparently the explanatory power of the various determinants and the weight of the various consequences differ between historical periods. However, much needs to be done to explain the links between entrepreneurship and economic growth.

10. Moreover, it is likely that economic decline, such as that experienced in 18th century Holland and late 19th and most of 20th century Britain, was aggravated by the cultural and institutional framework becoming less conducive to entrepreneurship (Wennekers and Thurik, 1999).

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