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Entrepreneurship and its Conditions: a Macro Perspective

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Abstract: The rate of entrepreneurship, a multidimensional concept including both the percentage of existing business owners in the labor force as well as the start-up rate of new enterprises, varies substantially across countries and over periods of time. Data for several modern Western nations including the United States, the United Kingdom and the Netherlands suggest a U-shaped recovery in rate of entrepreneurship (as measured by business ownership) toward the end of the 20th century. However, the timing, pattern and extent of this recovery vary substantially across nations. The reasons for this large variation in rate of entrepreneurship across time and by country are by no means straightforward. This paper provides a framework explaining the causes of the variation in rate of entrepreneurship across countries. The last part of the paper illustrates the framework with two historical case studies: the Dutch Golden Age of the 17th century and Britain's First Industrial Revolution (1760-1830). The approach taken is eclectic, integrating various research streams in the social sciences. Policy implications are also proposed.

Keywords: entrepreneurship, business ownership, culture, institutions, economic history

1. Introduction

In the late 20th century, entrepreneurship re-emerged as a key agenda item of economic policy makers across Europe, both for specific nations as well as for the European Union as a whole (Brock and Evans, 1989; OECD, 1998;

European Commission, 1999; EZ, 1999; Carree and Thurik, 2002). It also returned as a topic of interest in the field of economics, having played a central role in economic theory between the 18th and early 20th centuries (Hébert and Link, 1989, Van Praag, 1999). Moderate economic growth coupled with persistently high levels of unemployment in the late 20th century stimulated expectations of entrepreneurship's potential as a source of job creation and economic growth (Acs, 1992; Thurik, 1996, Audretsch and Thurik, 2000).

This ebb and flow of interest in entrepreneurship is probably due to variations of the role of entrepreneurship over time and across countries. In the early and mid 20th century – in fact until the 1970s – the proportion of self-employed and small businesses in most developed Western economies declined steadily. During this period, a focus on entrepreneurship was virtually absent from the European economic policy agenda. The exploitation of economies of scale and scope was thought to be at the heart of modern economies (Teece, 1993). Small businesses were considered to be a vanishing breed. This was also a period of relatively well-defined technological trajectories, of stable demand and of seemingly clear advantages of diversification. Neo-classical economics and equilibrium theory left little room for the concepts of initiative, autonomy and the struggle with new ideas and uncertainty. As a result, references to the entrepreneur receded from the microeconomic textbooks (Barreto, 1989; Kirchhoff, 1994). Audretsch and Thurik (2001) characterize this period as one where stability, continuity and homogeneity were the cornerstones and label it the 'managed economy'. The late 20th century witnessed massive downsizing and restructuring of many large firms built on certainty and the virtues of scale as well as the decline of the centrally-led economies in Central and Eastern Europe. By the 1980s evidence mounted to demonstrate that this move away from large firms toward small, predominantly young firms was a sea-change, not just a temporary aberration. Audretsch and Thurik (2001) label this new economic period, based less on the traditional inputs of natural resources, labor and capital, and more on the input of knowledge and ideas, as the 'entrepreneurial economy'. Paradoxically, the increased degree of uncertainty creates opportunities for small and young firms, and hence leads to higher rates of entrepreneurship. Further study shows that this change does not take place in all developed economies at the same time or to the same degree (Audretsch, Thurik, Verheul, Wennekers, 2002). Hence comparative research may explain these variations (Reynolds et al., 2001, Uhlaner, Thurik and Hutjes, 2002).

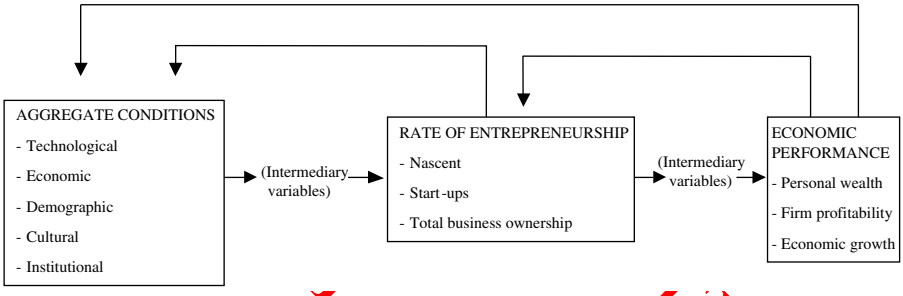
In spite of this growing interest in comparative research, the understanding of these variations in entrepreneurship at the macro level is limited. A comprehensive theoretical framework is needed to provide direction for this research. The goal of the present paper is to provide an overview and further direction for this emerging topic of macro-level analysis of entrepreneurship. In Section 2 we provide an overview of the definitions and measures of

entrepreneurship relevant at the macro-level of analysis as well as some evidence demonstrating variation of rate of entrepreneurship over time and across countries. In Section 3 we present a framework for explaining the causes of the variations in entrepreneurship. Finally, in Section 4, we illustrate the framework presenting two case studies, the Dutch Golden Age of the 17th century and Britain's First Industrial Revolution (1760-1830).

Our framework of entrepreneurial behavior is influenced by supply-demand models from the economics literature[1] as well as by an eclectic model proposed by Verheul, Wennekers, Audretsch and Thurik (2002). The framework focuses on the country level of analysis but is also linked to the level of individual occupational and career choices. Accordingly, the analysis is not confined to economics but also draws upon insights from other parts of the social sciences. Figure 1 presents the framework.

A study sponsored by the OECD states that "there is no unique set of causes" (OECD, 2000:155) and points to the conclusion that technological,

Figure 1 : A Framework of Entrepreneurship at the Macro Level



economic, institutional and cultural factors all play a part in explaining the decline and revival of self-employment, i.e., the role of entrepreneurship, in individual countries. These factors are incorporated into the framework as influences on the rate of entrepreneurship, as reflected in nascent entrepreneurship, start-ups and total business ownership. In the subsequent discussion, we refer to these factors as the aggregate conditions and further identify and discuss the intermediary variables that explain these different relationships. Figure 1 also shows that the rate of entrepreneurship impacts economic performance at the individual, firm and societal levels, affecting personal wealth, firm profitability, and economic growth. Although the framework implies a causal sequence from aggregate conditions to rate of

1. Clearly, supply and demand are among the basic concepts in any textbook on economics. They often refer to the product market, but are also applied to the labor market, including the market for entrepreneurship. The supply side of entrepreneurship is self-evident, while its demand side is less often acknowledged. For a discussion of demand for entrepreneurship see Casson (1995:94) and Storey (1994, chapter 2).

entrepreneurship to economic performance, we acknowledge the dual causality among these relationships as reflected by the feedback loops shown in Figure 1. Elaboration of the latter part of the framework, relating rate of entrepreneurship to economic performance, is beyond the scope of the present paper and is reserved as the topic of a follow-up paper in the present journal (Thurik, Uhlaner, and Wennekers, 2003).

2. Entrepreneurship at the Macro Level of Analysis

We first provide an overview of the definitions and measures of entrepreneurship relevant at the macro-level of analysis as well as some evidence demonstrating variation of rate of entrepreneurship across time and countries.

2.1. Definitions and Dimensions of Entrepreneurship

Measurement and comparison of the level of entrepreneurship for different time periods and countries is complicated because there is neither a universal definition of entrepreneurship nor a universal set of indicators (OECD, 1998; Van Praag, 1999; Lumpkin and Dess, 1996; Bull and Willard, 1993). This diversity of views is due to entrepreneurial theories that derive from three major intellectual traditions, each tracing its origin to Richard Cantillon (Cantillon, 1931; Hébert and Link, 1989). According to Hébert and Link, the first is the German tradition of Von Thünen and Schumpeter (Schumpeter, 1912), the second is the Chicago or neo-classical tradition of Knight and Schultz (Knight, 1921, Schultz, 1975) and the third is the Austrian tradition of Von Mises and Kirzner (Kirzner, 1979, 1997). These traditions point to different aspects of the function of the entrepreneur. In the German or Schumpeterian tradition economists concentrate on the entrepreneur as a creator of instability and creative destruction, where the entrepreneur (or enterprise) changes the 'rules of competition' for the industry (Schumpeter, 1912, Stopford and Baden-Fuller, 1994).

The Austrian school focuses on the abilities of the entrepreneur to perceive profit opportunities, usually after some exogenous shock. According to this view, the entrepreneur combines resources to fulfill unsatisfied needs or to improve market inefficiencies or deficiencies. Combining the two views, Nooteboom (1993) notes that 'the creation of potential may be seen as Schumpeterian and its realization as Austrian' (Nooteboom 1993, p.1). Finally, in the (neo-) classical perspective, entrepreneurs lead markets to equilibrium.

Integrating these views, we define entrepreneurship as "the perception and creation of new economic opportunities" combined with "decision-making on

the location, form and use of resources" (Wennekers and Thurik, 1999). While decision-making on resources is indispensable in all three perspectives, it seems most strongly linked to the neo-classical tradition. When making decisions on the use of resources becomes the dominant angle, however, we refer to management rather than to entrepreneurship (Stevenson and Gumpert, 1991).

To operationalize the concept of entrepreneurship, one can take a static or a dynamic perspective (Wennekers, 1999). The static perspective views entrepreneurship as a component of the industrial structure of the economy at a particular point in time. The dynamic perspective views entrepreneurs as agents of change, by starting new businesses, experimenting with new techniques and a new organization of production, introducing new products or even creating new markets.

Self-employment or business ownership rate is the most important static indicator of entrepreneurship (EIM/ENSR, 1995). Self-employment refers to people who provide employment for themselves as business owners. Two categories of self-employment and business ownership can be identified. The first category concerns those leading an unincorporated business and who draw no salary but use the profits of the enterprise to cover personal expenses. The second category concerns owner-managers who gain a share of the profits as well as a salary from an incorporated business. These entrepreneurs run a risk equal to their share of the invested capital in the business. In comparing country data, it is important to know which definition is being used, and to correct for inconsistencies. In the present paper, we consider the appropriate "static" measure to be the broader definition, covering both categories –owners of incorporated and unincorporated businesses, but excluding the so-called unpaid family workers and wage-and-salary workers operating a side-business as a secondary work activity (Carree, van Stel, Thurik and Wennekers, 2002).

For the dynamic perspective several indicators can be used including nascent entrepreneurial activity (the prevalence of people having made the decision to start a new business and actively engaged in activities to launch the firm)[2], gross entry of new business start-ups, net entry (gross entry minus business closures or exit) and the turbulence rate (total of entry and exit).

Neither the static nor dynamic indices measure corporate entrepreneurial activity, even though "corporate" entrepreneurs or intrapreneurs working in larger corporation may also engage in new opportunities and drive the development of new resource combinations, in the Schumpeterian sense (Burgelman, 1984; Pinchot, 1985; Stopford and Baden-Fuller, 1994).

2. In the Global Entrepreneurship Monitor (GEM) study, a person is considered to be involved in a nascent firm "if he or she had engaged in any activity to start the firm in the past 12 months, expected to own all or part of the new firm once it became operational, and the initiative had not paid salaries or wages to anyone for more than three months."(Reynolds et al., 2000:52).

However, as far as we know, an index of corporate entrepreneurship has not been developed. Recognizing this shortcoming, we nevertheless focus on measurements that primarily reflect "individual" entrepreneurship and business ownership.

2.2. Variation in Entrepreneurship Over Time and Across Countries: The Evidence

2.2.1. Variation over Time

Some indirect measures suggest that self-employment and business ownership in several Western European countries had declined to less than 50% of the labor force by the late 18th century (Braudel, 1982:52-54). More systematic data on business ownership, available by the late 19th century, shows continued and widespread decline in self-employment rate until late in the 20th century (Phillips, 1962:25). In the Netherlands, for example, based on Dutch census data, Wennekers and Folkeringa (2002) estimate that business ownership declined from nearly 25% of the Dutch labor force in 1899 to below 10% in 1980. Blau (1987) observes that the proportion of male and female self-employed in the nonagricultural US labor force declined during most of the 20th century until around 1970. Storey (1994 26) presents comparable data for the United Kingdom .

In the 1970s and 1980s, the managed economy began to show signs of weakening in several advanced economies. Large firms were subject to waves of downsizing and restructuring; entrepreneurship was rediscovered (Carree, 1997; Gavron, Cowling, Holtham and Westall, 1998; Thurik, 1999; Wennekers and Thurik, 1999; Audretsch and Thurik, 2001). Systematic empirical evidence documents the shift in economic activity that took place during this period away from large firms to small, predominantly young, enterprises (Acs, Carlsson and Karlsson, 1999). For instance, Carlsson (1989 and 1999) reports that whereas the employment share of the 500 largest US industrial companies (the *Fortune 500*) grew from 13% in 1954 to 19% in 1969, this share declined to less than 9% in 1996. A growing prevalence of business ownership in both the US and many other countries provided another indication of the revival of entrepreneurship. Finally, start-up rates of new firms rose in the late 20th century (Carree, van Stel, Thurik and Wennekers, 2002). In the Netherlands, for example, the number of business start-ups doubled in the period 1987 to 2000.

Table 1: Business ownership in 1972, 1984 and 1998

Country	*Number of business owners (x 1000)*			*Business ownership rate in labor force (%)*		
	1972	1984	1998	1972	1984	1998
Austria	281	218	310	9.3	6.5	8.0
Belgium	398	422	516	10.5	10.2	11.9
Denmark	200	178	181	8.2	6.6	6.4
Finland	145	170	207	6.6	6.6	8.2
France	2468	2361	2208	11.3	9.8	8.5
Germany *	2073	1945	3398	7.6	6.8	8.5
Greece **	524	684	825	16.1	17.7	18.6
Ireland	77	104	182	6.9	8.0	11.2
Italy	2811	3657	4279	14.3	16.5	18.2
Luxembourg **	16	13	14	10.7	8.3	5.9
Netherlands	586	517	809	10.0	8.1	10.4
Portugal **	405	480	760	11.3	10.6	15.2
Spain	1551	1572	2136	11.8	11.3	13.0
Sweden	292	314	349	7.4	7.2	8.2
United Kingdom	1968	2335	3162	7.8	8.6	10.9
EU-15	13795	14969	19337	10.1	10.0	11.3
Iceland	11	12	20	11.1	9.1	13.2
Norway	165	177	164	9.7	8.7	7.1
EEA	13971	15158	19521	10.1	10.0	11.2
Switzerland	236	251	363	6.6	6.8	9.1
EUR-18	14206	15409	19885	10.0	9.9	11.2
USA	7103	11943	14332	8.0	10.4	10.3
Japan	6479	7470	6782	12.5	12.6	10.0
Canada	734	1287	2208	7.9	10.0	14.1
Australia	734	1146	1454	12.6	16.0	15.5
New Zealand	133	175	266	10.2	11.0	14.2
Total	29,390	37,430	44,927	9.8	10.6	10.9

* West-Germany for 1972 and 1984; ** Provisional figure for 1998.
Source: COMPENDIA 2000.1 (See www.eim.nl).
Note: business ownership is defined including both the owners of incorporated and unincorporated businesses, but excluding unpaid family workers and wage-and-salary workers operating a side-business as a secondary work activity. Business owners in the primary sectors of economy are also excluded.

Table 1, based upon EIM's dataset COMPENDIA 2000.1[3], reports on business ownership rates for 23 OECD countries, excluding agriculture. The rate of business ownership across 23 major OECD countries increased from 10% to 11% of the total labor force between 1972 and 1998 (representing a change, in absolute terms, from 29 million to 45 million owners and a slightly slower proportional growth of the overall labor force). The timing, magnitude, and pattern of growth vary by individual country during this period. For the United States and Australia growth occurred primarily in the 1970s and 1980s. Other OECD countries, including Greece, Ireland, Italy, the United Kingdom, Canada and New Zealand, showed a continuous rise of business ownership in the period 1972 to 1998. By contrast, in Austria, Belgium, Finland, Germany, the Netherlands, Portugal, Spain, Sweden, Iceland and Switzerland the revival of entrepreneurship did not start until the 1980s. In spite of a period of stabilization in growth, by the end of the century, the United States still accounted for the highest number of business owners: about 32% of all business owners within these 23 countries as of 1998.

Not all the listed OECD countries experienced a growth in entrepreneurship. Four countries – Denmark, France, Luxembourg and Norway – actually suffered a continuous decline in business ownership in the period 1972 to 1998. Finally, Japan began to experience a sharp decline in business ownership in the mid 1980s.

In sum, between the early 1900s and 1970, the rate of entrepreneurship, as measured by business ownership, steadily declined while employment in larger firms increased. Then, between 1970 and the end of the 20th century, and depending on the country, a reversal of this pattern emerged in many OECD countries. Piore and Sabel (1984) foresaw this shift and labeled it the "second industrial divide." Looking back, Audretsch and Thurik (2000, 2001) refer more explicitly to a U-shaped curve, representing the steady decline and subsequent renewal in entrepreneurship (and corresponding shift in large firm employment) as the "shift from the managed to the entrepreneurial economy."

2.2.2. Variation across Countries

As pointed out in the previous section, in addition to global changes in the rate of entrepreneurship over the past century, it also differs considerably across countries. These differences may be due to economic and cultural factors. For instance, four of the six countries with the lowest rate of business ownership (below 8.5% in 1998) are Scandinavian, including Denmark, Norway, Sweden and Finland. They also share several characteristics associated with lower business ownership rates, including a high per capita income, high female

3. See www.eim.nl

labor participation rates, low income disparity, a large public sector and a relatively low degree of dissatisfaction with life (Wennekers, Noorderhaven, Hofstede and Thurik, 2001; Henrekson, 2000). By contrast, three of the four countries with the highest business ownership rate (in excess of 15% in 1998) are Mediterranean countries, including Greece, Italy, and Portugal. For these countries, but especially Greece and Portugal, a relatively low per capita income rate and relatively high life dissatisfaction rates have been associated with higher self-employment. Spain, with 13% self-employment, also fits this pattern. Italy is more of a mixed story, characterized by a low per capita income in the Mezzogiorno (Southern Italy) and a fairly unique industrial structure in Northern Italy based on industrial districts and an emphasis on small family businesses. Australia, with one of the highest self-employment rates at 15.5%, may have an even more unique set of circumstances influencing its rate of entrepreneurship. It has the highest immigration rate in the world: 23.4% of its population is foreign-born, compared to only around 10% in the US where immigration has also often been referred to as an advantageous economic factor (Drucker, 2001). In sum, though some obvious patterns emerge, these explanations leave many unanswered questions even among the OECD nations. For instance, business ownership rates are high in New Zealand (14.2%), Canada (14.1%) and Iceland (13.2%), raising the question whether there are common causes. Furthermore, initial studies suggest that the determinants of self-employment in advanced countries may be quite different than those of developing nations (Acs, Audretsch and Evans, 1994).

Note that the United States is slightly below the average, at 10.3% self-employed out of the total labor force, despite its reputation for leading the world in entrepreneurship. This figure may reflect some of the limitations of using a static index. The Global Entrepreneurship Monitor (GEM) provides a different set of comparisons by country (Reynolds, Camp, Bygrave, Autio and Hay, 2001).[4] The Global Entrepreneurship Monitor was designed to measure the variety in entrepreneurial activity across nations on an annual basis to find explanations for this variety and to explore the impact of entrepreneurship on economic growth.

GEM bases the rate of entrepreneurship on dynamic measures rather than on the business ownership rate. Its overall index, the Total Entrepreneurial Activity (TEA), sums the proportion of nascent entrepreneurs as a proportion

4. In its first year (1999), ten countries, including the so-called G7, (the United States, Japan, Great Britain, France, Germany, Italy, and Canada) participated in GEM (Reynolds et al., 1999). The 2001 wave of data includes 29 countries, with a total working-age population (20-64 years old) of 1.4 billion (Reynolds et al., 2001:4). Data are assembled annually for each participating country from four basic sources: 1) surveys of at least 2,000 adults in each country; 2) in-depth interviews with national experts on entrepreneurship in each country; 3) standardized questionnaires completed by the national experts; and 4) a wide selection of standardized national (statistical) data. For more information on both the GEM-project and its major results, see Reynolds et al. (2001).

of the adult population, i.e., 18-64 years of age, with the presence of new firms, i.e., the proportion of adults operating a business that is less than 42 months old. TEA rates in the 29 countries participating in GEM 2001 range from below 6% in Belgium, Japan, Singapore and Israel to above 14% in Brazil, Korea, Australia, New Zealand and Mexico, with the US showing a TEA-index of just below 12% (see Table 2). Stated differently, in Mexico and New Zealand, one in every five or six adults is currently trying to start a new business or is the owner/manager of an active business less than 42 months old, compared with one in nine in the United States and one in about 20 in Belgium, Japan and Singapore. In short, there is considerable variation across different countries.

Taken together, the results from the EIM and GEM research studies demonstrate that variation across time and countries exists. However, the choice of the measure can lead to different rankings among the nations. In the next section of this paper, we present a framework that can aid in our understanding of these phenomena.

Table 2: Variation of total entrepreneurial activity (TEA) in 2001, across 29 countries

TEA rate	Country
4-6%	Belgium, Japan, Singapore, Israel
6 - 8%	The Netherlands, Sweden, Russia, Germany, Portugal, France, UK, Spain
8 - 10%	Denmark, Norway, Finland, South Africa, Poland
10 - 12%	Italy, Argentina, Canada, India, Hungary, USA
12 - 14%	Ireland
More than 14%	Brazil, Korea, Australia, New Zealand, Mexico

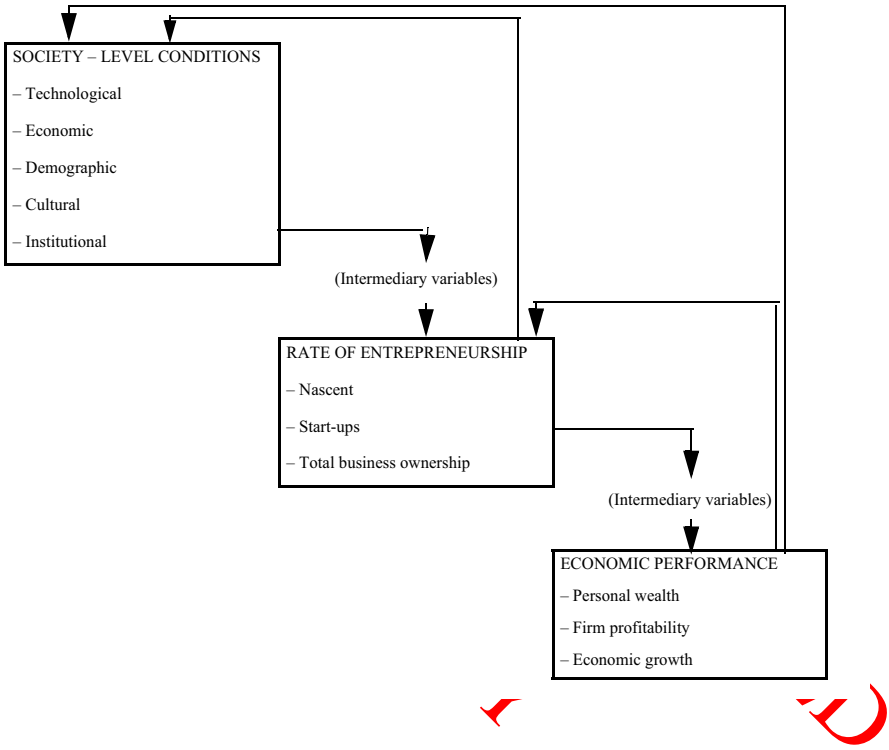
Source: Reynolds, Camp, Bygrave, Autio and Hay (2001: 7).

3. The Determinants of Entrepreneurship at the Macro Level

Above we presented our framework of entrepreneurial behavior (in Figure 1). This framework is broad in scope and can be divided into three parts. The first part of the framework explains how various conditions, including technology, level of economic development, demography, culture and institutions, exert their influence on nascent entrepreneurship (the attempt to start a company) by way of individual occupational choice. The second part of the framework provides insight into how nascent entrepreneurship influences the actual rate

of business ownership, considering various intermediary and conditional variables. The final part of the framework explores the linkages between the different aspects of entrepreneurial behavior, i.e., nascent entrepreneurship, start-ups, and business ownership, and economic performance at the individual, firm and macro levels. The present paper covers the first two parts of the framework. The third part, on the consequences of entrepreneurship, is beyond the scope of the present paper and is discussed in a subsequent paper (Thurik, Uhlaner, Wennekers, 2003).

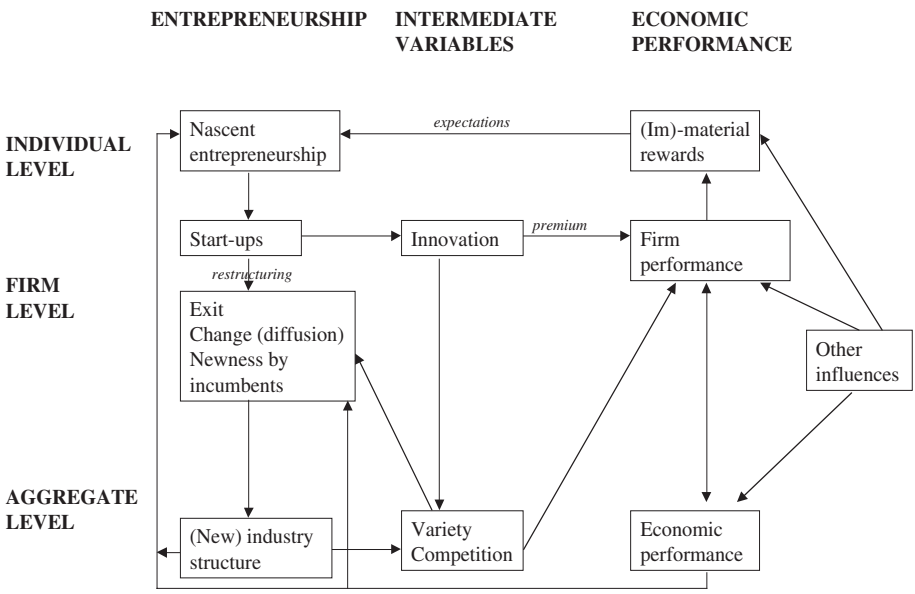
Figure 1: A Framework of Entrepreneurial Behavior



3.1. The Determinants of Nascent Entrepreneurship and Startups

The rate of entrepreneurship is defined to encompass nascent and start-up activities as well as total numbers of entrepreneurs (usually measured by self-employment). We present a detailed version of the first part of the framework in Figure 2.

Figure 2: Entrepreneurship and Economic Performance



Central to the framework of Figure 2 is the assumption that individuals choose between wage-employment and business ownership by assessing and weighing the potential financial and non-pecuniary rewards and risks. These rewards and risks are influenced by an individual's perception of the opportunities and his or her personal capabilities and preferences. Our framework posits that it is the aggregation of these occupational choices which impacts the rate of nascent entrepreneurship in a country. The framework further links aggregated conditions, such as technology, economic development, demography, institutions and culture with these individual assessments through either the demand-side or the supply side. In particular, the demand-side of entrepreneurship refers to the opportunities available for starting a business. The supply-side of entrepreneurship refers to the pool of individuals with both the capabilities and preferences to start a business. The framework posits that the greater the demand for entrepreneurship, i.e., the availability of opportunities, and the supply of entrepreneurial talent, the larger the proportion of the population that will choose independent business ownership as an occupational choice.

3.1.1. Occupational Choice

The proposed framework assumes that occupational choice involves the process of assessing and weighing the risks and rewards of different types of employment. In modeling occupational choice and particularly the choice between business ownership and wage employment it is often assumed[5] that individuals valuate and compare the expected financial and non-pecuniary rewards of these alternatives (Blau, Gustad, Jesson, Parnes and Wilcox, 1956; Bird, 1989). Here we generalize this approach by assuming that individuals compare both the rewards and the risks of their occupational and career options. We consider net rewards, taking inputs (such as working hours) and other costs (such as risking a secure position in someone else's firm) into account. Finally, one may also regard unemployment and unpaid work, such as housework or other domestic activities, as occupational options. The total utility of the alternative options depends upon personal assessments of all financial and non-pecuniary risks and rewards. Weighing the alternatives according to personal preferences results in an individual's 'risk-reward' profile of self-employment versus wage-employment[6] (or sometimes unemployment). Each individual has his or her own risk-reward profile, guiding personal occupational choice.

If we equate occupational choice with "intention to act", the main occupational choices are the intentions of potential entrepreneurs (such as wage earners, students, housewives and unemployed) to set up shop. Thus, the rate of nascent entrepreneurship reflects the proportion of the adult population that seriously intends to start a business and actively explores the possibilities to do so. The next step is the actual start-up of the business. Start-up is not only a function of individual risk-reward profiles, but also depends upon the environment – the business cycle, institutional factors, such as the availability of financing and government regulation, technology, level of economic development and disequilibrium forces we will explain later in the paper. However, first, we will discuss the factors influencing nascent entrepreneurship that are presented in Figure 2.

3.1.2. Demand Side and Supply Side of Entrepreneurship

Factors at the demand side and supply side of entrepreneurship provide the key intermediary linkages between aggregate conditions and occupational choice.

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5. See Acemoglu (1995) and Murphy et al. (1991). An earlier model distinguishing between entrepreneurship and wage-employment and couched in terms of opportunity costs of entrepreneurship, is presented by Lucas (1978).
6. An alternative formulation would be to consider the expected rewards of wage-employment as the opportunity costs of self-employment.

The supply and demand sides of the product market do not always coincide with those of entrepreneurship. In fact, the "demand" for entrepreneurship can also be influenced by typical product supply side factors such as technological developments. The demand side of entrepreneurship represents the opportunities for setting up a viable business. Individuals may be pulled toward a decision to start a business based on perceived environmental opportunities. Opportunities are created by the characteristics of the market. Those opportunities may be found in emerging technologies, in the industrial structure and in the degree of differentiation of consumer demand. But demographic, cultural and institutional factors also can foster or impede these opportunities.

Key elements of the supply side of entrepreneurship are the capabilities of individuals and their attitudes towards entrepreneurship. Whether a particular individual acts upon an opportunity depends upon an individual's capabilities, i.e., external resources, skills and personality traits, and preferences. As shown in Figure 2, demographic characteristics, culture and institutions particularly impact the supply side (individual capabilities and preferences). The level of economic development also influences the supply side (not indicated in Figure 2), for instance, through the availability of financial resources for business start-ups.

Below we will explore each of these aggregate conditions in more detail.

3.1.3. The Role of Technology

A change in technology is perhaps the most significant reason for expanded entrepreneurial opportunities in the late 20th century and early 21st century. In any era, new technologies have the potential to lead to new goods and services, creating opportunities for start-up of new firms. But a major factor in the restructuring of the modern economy relates to the new information and communication technologies that have emerged. These technologies have resulted in radically diminished transaction costs and lower minimum efficient scales in many industries. This lowering of transaction costs and related scale effects have opened the doors for many smaller businesses previously not able to compete, both in existing industries and in new ones as well. Some have even suggested that these changes are revolutionary in implication. In this respect Jensen (1993) uses the term 'Third Industrial Revolution', while Freeman and Perez (1988) talk about the 'transition from the fourth to the fifth Kondratiev wave'. It should be noted that not all economists view these changes as permanent. Often, when new technologies mature, economies of scale return with a resulting shakeout of suppliers. Over the course of the 20th century this pattern typically led to a greater representation of larger firms exploiting economies of scale through mass-production. (Klepper and Graddy,

1990; Klepper and Simons, 1993; Klepper and Miller, 1995; Klepper, 1996; Carree and Thurik, 2000). It may be too soon to determine whether or not the present new technologies will eventually lead to similar outcomes.

3.1.4. The Role of Economic Development

The level of economic development is a factor primarily influencing environmental opportunities. In particular, the shift in the industrial structure from manufacturing to services (Inman, 1985) creates opportunities for new, smaller firms because in many service industries economies of scale and other barriers to entry are lower than in manufacturing. Per capita income is another influence of the changing industrial structure, which has given rise to greater entrepreneurial opportunity. Rising incomes generally boost general demand and for services in particular. Further, there is evidence that the average level of income and wealth determines the variety of consumer demand (Jackson, 1984). A high differentiation in demand favors the suppliers of new and specialized products and diminishes the scale advantages of large incumbent firms. There is evidence that in some sectors small businesses are more capable than large ones in conquering upcoming market niches (Jovanovic, 1993).

The level of economic development influences the supply side of entrepreneurship, for example through the availability of financial resources for business start-ups. Furthermore, in the economic literature, explanations for the rebound in entrepreneurship in the late 20th century are based on supply side factors such as tax rates, unemployment, competition and female labor participation (Blau, 1987; Blanchflower and Oswald, 1994; Blanchflower, 2000; Evans and Leighton 1989a; Meager 1992, Acs, Audretsch and Evans, 1994; Audretsch, Thurik, Verheul and Wennekers, 2002). One last illustration of the complexity of the influence of some of these factors comes from a study of unemployment and entrepreneurship carried out by Audretsch, Carree and Thurik (2001). In their study, they assume a two-way causation between changes in the level of entrepreneurship and that of unemployment– a "Schumpeter" effect of entrepreneurship reducing unemployment and a "refugee" or "shopkeeper" effect of unemployment stimulating entrepreneurship. They try to reconcile the ambiguities found in the relationship between unemployment and entrepreneurship by introducing a two-equation model where changes in unemployment and in the number of business owners are linked to subsequent changes in those variables for a panel of 23 OECD countries over the period 1974-1998. The existence of two distinct and separate relationships between unemployment and entrepreneurship is identified including significant "Schumpeter" and "refugee" effects.

3.1.5. The Role of Demographic Factors

Research at the micro-level identifies several links between demographic factors and self-employment. Some of these variables include age, ethnic origin, level of educational attainment, gender, and previous experience in self-employment (Cooper and Dunkelberg, 1987; Evans and Leighton, 1989b; Delmar and Davidsson, 2000; Storey, 1994; Erutku and Vallée, 1997; Reynolds, 1997).

With respect to age, research suggests that people in the middle age cohorts (25-45 years of age) have the highest prevalence of incumbent business owners (Storey, 1994). Ceteris paribus, the ageing of the population in most developed countries implies a threat for the future development of business ownership. Prevalence rates of nascent entrepreneurship are highest in the age group between 25 and 34, though according to some research, a tendency towards start-ups at a younger age is also apparent.[7]

Although demographic variables have been used to distinguish nascent entrepreneurs versus control groups within populations such as the US and Sweden, research that uses demographic characteristics to predict differences in rate of nascent entrepreneurship across countries is more limited. With regard to macro level influences, it is difficult to find studies that systematically relate these characteristics of the various countries to their business start-up rates (Delmar and Davidsson, 2000). More research has been done to compare regions within countries. Summing up seven such studies, Reynolds, Storey and Westhead (1994) conclude that population growth, a dense, urbanized context, and a population of business organizations dominated by small firms influence firm birth rates.

Education is somewhat of an anomaly. Whereas research conducted on a Swedish sample at the individual level shows that nascent entrepreneurs have attained on average a higher educational level than those in a control sample (Delmar and Davidsson, 2000), other research leads to the opposite conclusion. Blau and Duncan (1967) conclude that educational attainment is a more important predictor of someone's occupation than background characteristics such as the father's occupation or education. They also conclude that intergenerational mobility within business families increases and, as a result, children of business owners increasingly choose to pursue a different career than their parents. However, the relationship between education and static indices of entrepreneurship can lead to opposite results. For instance, in a more recent comparative study across fourteen OECD countries, countries with a higher level of education tend to have a smaller proportion of self-employment (Uhlaner, Thurik, and Hutjes, 2002). Female labor force participation is negatively associated with self-employment in the

7. See Van Gelderen (1999:21) ,EIM/EZ (2000) and Delmar and Davidsson (2000).

same study. This latter finding is consistent with those at the micro-level of analysis where gender is a strong predictor of nascent entrepreneurship: men are more likely to have the intention to start a firm than are women (Delmar and Davidsson, 2000).

Further research is needed to separate out the different effects of demography at the macro-level of analysis. Findings to date are contradictory. For instance, whereas factors such as education provide a larger pool of nascent entrepreneurs, these same factors do not always translate into an end result of a higher rate of business ownership.

3.1.6. The Role of Institutions

North (1994:360) defines institutions as "... the humanly devised constraints that structure human interaction. They are made up of formal constraints (e.g., rules, laws, constitutions), informal constraints (e.g., norms of behavior, conventions, self-imposed codes of conduct), and their enforcement characteristics. Together they define the incentive structure of societies and specifically economies". Institutions include the family, educational, economic and political systems and legislation. Further, they encompass both general institutions, such as the fiscal and the educational system, and specific government policies and fiscal support schemes focusing on new firms.

In the Global Entrepreneurship Monitor study, Reynolds et al. (2000) include the following examples of institutions: the functioning and regulation of capital markets and the labor market, competition and establishment legislation, the tax system, social security and the educational systems. They also include various public and commercial support organizations. General institutions and specific policy measures may influence either the key determinants in the individual decision making processes, and in that way co-determine rate of entrepreneurship, or the mechanism itself, i.e., the manner in which these variables determine the decisions with respect to entrepreneurship career decisions.

On the demand side, institutions and specific government policies dealing with the (de-)regulation of entry and privatization or collectivization of many services and utilities influence opportunities to start a business. Moreover, fiscal incentives, subsidies, labor market regulation and bankruptcy legislation co-determine the net rewards and the risks of the various occupational opportunities. Over the past decades changing institutions have had an accommodating effect on the creation of new entrepreneurial opportunities in many countries. Some striking examples are the changes in establishment legislation (business licensing) in The Netherlands (EZ, 1999), the increasing attention for competition at the level of the European Union and the broadening scope of the private sector in many countries, due to deregulation

and to a decreasing tax and social security wedge (Henrekson, 2000; Wennekers, 1992).

On the supply side, on the other hand, institutions play a role in stimulating entrepreneurial capabilities and preferences. Stevenson (1996) gives an overview based on the experience in the Atlantic region of Canada. Identifying the particular needs of target groups such as women, youth, corporate employees and the unemployed is a first step in her analysis. Potential partners for strengthening abilities and motivation are business support organizations, large corporations with an interest in intrapreneurship or 'spinning-off', educational institutions and the media. The availability of capital, by developing the (venture) capital market or through financial support schemes, can be added to this list. A recent study by Stevenson and Lundström (2001), based upon a comprehensive comparison of entrepreneurship/SME policy and practice in ten economies, presents many instances of general institutions and specific schemes designed to foster entrepreneurship.

Regarding the effectiveness of specific public support schemes, the evidence is scant and at best mixed. OECD (2000:188) concludes: 'Unfortunately, there are still very few rigorous evaluations of the cost-effectiveness of these and other policies to support self-employment'.[8] Future research is needed to elaborate on relevant institutional variables.

3.1.7. The Role of Culture

Kroeber and Parson (1959:583) define culture as "patterns of values, ideas and other symbolic-meaningful systems as factors in the shaping of human behavior." Barnouw (1979:5) defines culture as configurations of "stereotyped patterns of learned behavior which are handed down from one generation to the next." Hofstede (2001:9) refers to culture as "the collective programming of the mind that distinguishes the members of one group or category of people from another." Since values are typically determined early in life (Hofstede, 1980; Barnouw, 1979) they tend to be "programmed" into individuals resulting in behavior patterns consistent with the cultural context and enduring over time (Hofstede, 1980; Mueller and Thomas, 2000). Though culture shapes institutions, we regard culture as mainly 'between the ears' and institutions as 'observable in the outside world'.

Since extensive research at the psychological level shows a link between values, beliefs and behavior, it is plausible that differences in culture, in which these values and beliefs are imbedded, may influence a wide range of behaviors including the decision to become self-employed rather than to work for others (Mueller and Thomas, 2000). Using this logic, several studies

8. Storey (1999:190) also has pointed out that adequate evaluations of these different support schemes are rare.

explore the relationship between various aspects of culture and entrepreneurial behavior across cultures (Busenitz, Gómez and Spencer, 2000; Davidsson, 1995; Huisman, 1985; Lee and Petersen, 2000; McGrath and MacMillan, 1992; Mueller and Thomas, 2000; Tiessen, 1997; Wennekers, Noorderhaven, Hofstede and Thurik, 2001).

Davidsson (1995) identifies two views regarding the relationship between cultural values and entrepreneurial behavior. The first, the aggregate psychological trait explanation for entrepreneurship, is based on the idea that if a society contains more people with entrepreneurial values, more people will be entrepreneurs. Davidsson notes that this is essentially the perspective taken by McClelland (1961) and other proponents of the individualistic view of culture. Davidsson also identifies a second view, first set forth by Etzioni (1987) referred to as social legitimation. This latter view assumes that variation in entrepreneurship is based upon differences in values and beliefs between the population as whole and potential entrepreneurs. According to this latter view, it is precisely the clash of values between the groups that drives potential entrepreneurs away from the average organization and into self-employment (Wennekers, Noorderhaven, Hofstede and Thurik, 2001). We will discuss research on two types of cultural indicators researched at the macro-level of analysis: Inglehart's concept of post-materialism (Inglehart, 1977, 1990, 1997), and Hofstede's cultural indices. Although this research concerns aggregate self-employment, to be dealt with in the next section, it is discussed here because it reflects the importance of culture for entrepreneurship in general.

3.1.7.1. Post-materialism and rate of entrepreneurship

In order to explain observed changes in values in modern societies Inglehart proposed the materialism/post-materialism hypothesis. The post-materialism hypothesis describes the transformation in many countries from a culture dominated by materialistic-oriented individuals to a society in which an increasing proportion of the population prefers non-materialistic life-goals above materialist ones. The hypothesis of post-materialism is based on two sub-hypotheses, that of socialization and that of scarcity. The socialization hypothesis assumes that someone's values reflect the prevailing circumstances during his or her formative years. The scarcity hypothesis assumes that someone's priorities reflect his or her socio-economic circumstances; therefore someone attaches the greatest value to relatively scarce goods. Taken together these two hypotheses imply that, as a consequence of the unprecedented prosperity and the absence of war in Western countries since 1945, younger birth cohorts attach less importance to economic and physical security (materialistic values) than older birth cohorts who experienced

poverty in their early years. Instead, younger birth cohorts give higher priorities to non-material goals such as esteem, self-realization and quality of life (post-materialistic values) often referred to in the psychology literature as Maslow's "higher order needs" (Maslow, 1954).

Research by McGrath, MacMillan and Scheinberg (1992) shows that individual entrepreneurs from a wide variety of countries are more likely to have materialistic values, such as viewing success as making lots of money, than do their non-entrepreneur counterparts. However, they do not test for country differences. Blais and Toulouse (1998) do make such comparisons and conclude that entrepreneurs across countries tend to have similar motivations. In another study of individual entrepreneurs, Robichaud, McGraw and Roger (2001) find a positive correlation between extrinsic motivation of the entrepreneur and sales performance whereas they find negative relationships between the independent variables, intrinsic motivation and autonomy and independence on the one hand and the dependent variable, sales performance, on the other. These findings are interesting because at the micro-level they correspond to the thesis that entrepreneurs, especially successful ones, are more materialistic than their counterparts. In a study designed to test the relationship between post-materialism and levels of nation-wide entrepreneurship, Uhlaner, Thurik and Hutjes (2002) clearly confirm a negative relationship between post-materialism and self-employment: countries marked by less materialistic values tend to have lower self-employment as a proportion of the overall labor force. Further, although education is also strongly and negatively associated with self-employment, post-materialism explains additional variation in the dependent variable. Various other culture variables, including, life satisfaction, church attendance, and left right extremism also explain some variation in self-employment. In particular, greater dissatisfaction, church attendance and extremism all predict higher levels of self-employment. There is fairly high multicollinearity among the variables of the present study. However, they still appear to contribute a certain amount of unique explanation suggesting that post-materialism does matter as an independent predictor of self-employment.

3.1.7.2. Hofstede's cultural indices and rate of entrepreneurship

Whereas Inglehart only selects one primary index of culture, post-materialism, Hofstede identifies five indices, including power distance, uncertainty avoidance, individualism (as opposed to collectivism), masculinity (as opposed to femininity), and long-term versus short-term orientation (Hofstede, 1980, 2001). To date, the first three dimensions, power distance, uncertainy avoidance and individualism have been studied most extensively in relationship to rate of entrepreneurship.

According to Hofstede (2001:79), power distance stands for the degree of inequality in the relationship between bosses and their subordinates. Hofstede operationalizes power distance using three survey questions about "perceptions of subordinates' fear of disagreeing with superiors and of superiors' actual decision-making styles, and with the decision-making style that subordinates preferred in their bosses".

Uncertainty avoidance has to do with the extent to which societies tolerate ambiguity (Hofstede, 2001:146). People in uncertainty-avoiding cultures "look for structure in their organizations, institutions and relationships, which makes events clearly interpretable and predictable" (Hofstede, 2001:148.) In countries with weaker uncertainty avoidance "not only familiar but also unfamiliar risks are accepted, such as changing jobs and starting activities for which there are no rules". Hofstede (2001:148-149) operationalizes uncertainty avoidance using three survey questions about employees' orientation towards company rules, about their personal expected job stability and about how often they feel nervous or tense at work.

Individualism, as opposed to collectivism, "describes the relationship between the individual and the collectivity that prevails in a given society" (Hofstede, 2001:209.) In his research using the IBM database, Hofstede operationalizes individualism as the degree to which people state their work goals independently from their work organization. This operationalization is based upon a factor analysis using the (average) answer scores to fourteen work goal questions (Hofstede, 2001:214). The factor individualism loads positively on goals that stress the actor's independence from the organization, i.e., (a job which leaves you sufficient) personal time, freedom (to adopt one's own approach to the job) and challenge (work from which you can get a personal sense of accomplishment). It loads negatively on "... what the organization does for the individual: provide him or her with training, with working conditions, [or to] allow the individual to use his or her skills."

Research has tested the hypotheses that low uncertainty avoidance[9], low power distance and high individualism stimulate entrepreneurship, consistent with the aggregated psychological traits perspective mentioned previously (Wildeman et al., 1999). This approach assumes that countries where a more entrepreneurial cultural profile prevails will produce more (potential) entrepreneurs. However, the opposite could also be true regarding the rate of entrepreneurship. Applying the reasoning of Baum et al. (1993) to these indices, one could argue that entrepreneurial individuals in countries with high uncertainty avoidance, high power distance and low individualism have more difficulties in doing things their own way, since organizations and existing structures are less suited for them, consistent with the social legitimation

9. We are aware that risk and uncertainty are not synonymous, but for practical reasons we use uncertainty avoidance as a proxy for risk aversion.

interpretation described earlier. According to this dissatisfaction hypothesis, dissatisfied with their situation, they may choose for self-employment to be as independent as possible. As Wildeman et al. (1999) have shown in an empirical study using data of 22 OECD countries, Hofstede's indices of power distance and uncertainty avoidance turn out to be significantly and positively correlated with the level of self-employment. This is in accordance with the dissatisfaction hypothesis: countries with large power distance and strong uncertainty avoidance have more self-employed. The same holds for individualism, which is indeed negatively correlated (however, not significantly) with the level of self-employment.

Next to these deeply rooted inner values that change slowly, the 'cultural capital' of a country also entails the existence of role models. Potentially, role models are powerful instruments for stimulating entrepreneurship. One role model may be the family. However, new role models presented in the media, such as Bill Gates of Microsoft, or Steve Jobs of Apple Computer, may also provide a trigger for cultural change.

Culture may also have an indirect role vis-à-vis economic factors in a country. For example, it is straightforward to assume that in cultures characterized by high uncertainty avoidance the pull of good, i.e., safe and well-paid, jobs will be relatively strong, making the (assumed) negative relationship between average wage level and self-employment stronger than in countries with weak uncertainty avoidance. Conversely, one may expect that the effect of business profitability pulling people into business ownership will be stronger in weak uncertainty avoidance countries. Noorderhaven et al. (1999) test for such an interaction effect. In their empirical study of 22 OECD-countries in the 1974-1994 period, they find GDP per capita to have a strong negative effect on the rate of business ownership in a cluster[10] of nine high uncertainty avoidance countries[11], whereas GDP per capita seems to have no effect in the cluster of thirteen weak uncertainty avoidance countries (Noorderhaven et al., 1999) [12,13]. We interpret this finding as support for the idea that uncertainty avoidance has a negative impact on business ownership, albeit an indirect one, or that strong uncertainty-avoidance countries are 'wage-earner economies'.

The empirical results presented by Noorderhaven et al. (1999) also support the hypothesis of the differential effect of business profitability. The labor

10. The clustering was carried out with the K-means algorithm. See Noorderhaven et al. (1999).
11. The high uncertainty avoidance countries are Austria, Belgium, Luxemburg, France, Italy, Greece, Portugal, Spain and Japan.
12. The weak uncertainty avoidance countries are the United Kingdom, Ireland, The United States, Canada, Australia, New Zealand, Denmark, Finland Sweden, Norway, Germany, the Netherlands, and Switzerland.
13. For an update including more recent data and confirming these findings see Wennekers et al. (2001).

income share (as an inverse proxy of profitability) is found to have a negative effect on business ownership in weak uncertainty avoidance countries but no effect on business ownership in strong uncertainty avoidance countries.[14] Earning differentials between wage-employment and self-employment do have a stronger effect on entrepreneurship in a culture characterized by weak uncertainty avoidance. One might describe these weak uncertainty avoidance countries as 'entrepreneurial economies'.

3.1.8. Summary

The first step toward the prediction of the rate of entrepreneurship is to identify the determinants of nascent entrepreneurship. Aggregate conditions, including technology, level of economic development, demography, culture and institutions, influence the opportunities available for start-up. Economic, demographic, cultural and institutional conditions also impact the supply side, influencing the skills, resources and preferences of individuals within the population. In the next section, we will look at the relationship between nascent entrepreneurship, on the one hand, and total business ownership, on the other.

3.2. Determinants of Business Ownership at the Aggregate Level

Section 3.1.7 dealt with the interface of nascent entrepreneurship at the individual and self-employment at the aggregate level and reported that research findings can produce confusing results. For instance, whereas education may boost nascent entrepreneurship (Delmar and Davidsson, 2000) it may act to suppress self-employment at the country level of analysis (Uhlaner, Thurik and Hutjes, 2002). Although research available to date is not sufficient to explain away these and other anomalies, the framework of Figure 3 addresses the complex linkages involved among these different indicators of entrepreneurship. As a starting point, it is essential to understand the concept of the equilibrium rate of business ownership, explained in the following section.

3.2.1. Actual versus Equilibrium Rate of Business Ownership

14. Wennekers et al. (2001) find a positive effect for these countries, possibly indicating reversed causality.

At the country level, given the occupational choices made in the past, particularly with respect to nascent entrepreneurship, and given the entry and exit of entrepreneurs acting upon their occupational choices, a certain level of business ownership results. Expressed as a percentage of the labor force, this is called the actual rate of business ownership. Summarizing, this actual rate is determined by a combination of many factors, including cultural and institutional ones, operating at the demand and supply side. See Figure 3 for a schematic illustration.

Next to this actual rate or level there is the concept of an equilibrium level of business ownership, which has also been included in Figure 3. This rate can be considered a long-term equilibrium depending upon the state of technology and/or level of economic development in a country. This conjecture arises from analyzing empirical and theoretical work in this area (Carree, van Stel, Thurik, and Wennekers, 2002). The relationship is hypothesized initially to be a decreasing function of economic development. The business ownership rate is high in low-developed economies, whereas more developed countries where mass production and scale economies thrive have lower business ownership rates. Above we discussed an emerging literature pointing at a still later phase of economic development where the business ownership rate increases again. This phase is characterized by a reversal of this trend towards increasing economies of scale and scope. This reversal of the downward trend in business ownership rates since the early 1970s gives rise to two alternative hypotheses. First, one may assume a U-shaped relationship between equilibrium rates and economic development, due to the advent of the service economy and the differentiation of consumer demand, and reinforced over time by the opportunities offered by new technologies, particularly connected to information and communication. Second, one may assume that these new trends only lead to a bottoming out of the longstanding downward trend in the equilibrium rate, while viewing the U-shaped movement of actual business ownership rates in individual countries as an error correction of 'disequilibrium' due to overshooting in previous decades.

The actual level of business ownership does not necessarily equal the equilibrium level. In fact, many forces may cause the actual number of business owners to differ from the long-term equilibrium level (Carree, van Stel, Thurik and Wennekers, 2002). This 'disequilibrium' (also included in Figure 3) may particularly stem from cultural factors and institutional arrangements, such as the regulation of entry, incentive structures and the functioning of the capital market (Verheul, Wennekers, Audretsch and Thurik, 2002).

As Figure 3 indicates by means of several feed backs originating from 'disequilibrium', policy measures as well as market forces play a role in restoring equilibrium by triggering 'error correction' of future occupational choices resulting in changes in entry and exit. Depending on the nature of the

(assumed) disequilibrium, the government can try to restore equilibrium through policies fostering or restricting entrepreneurship. To intervene properly in the national economy, it is important that the government is able to perceive a deviation from the equilibrium rate of entrepreneurship. When the government is mistaken or has its own specific political ideas about the 'optimal' level of entrepreneurship, government intervention is likely to have a 'disturbing' rather than a 'restoring' effect. In this sense the government can also be a source of disequilibrium.

Market forces can play a role in restoring the equilibrium. In particular, this restoring capacity of the market works through (the valuation of) the number and type of entrepreneurial opportunities. In the late 1970s and the early 1980s the structurally low number of enterprises is likely to have contributed to a high level of unemployment (Carree, van Stel, Thurik and Wennekers, 2002). A high level of unemployment can push people into self-employment due to the relatively low opportunity costs of entrepreneurship (Storey, 1991; Evans and Leighton, 1989a; Audretsch, Carree and Thurik, 2001). On the other hand, when the number of business owners exceeds the equilibrium level this is assumed to diminish profitability, due to higher competition, resulting in high exit or failure rates and lower entry. A related question is of course what the speed of convergence is. There are indications that this speed may be quite slow.[15]

3.2.2. Interpretation of the Long Term Historical Development of the Equilibrium Rate

Considering the long term historical development of the equilibrium rate one should first note the structural decline of business ownership in many countries from the beginning of the 20th century until approximately the 1970s, a decline probably dating back much further into history. Prime determinants of this development were rising per capita incomes (real wages), industrialization (at least until the mid 20th century) and the exploitation of economies of scale and scope made possible by the maturing of many technologies introduced during the second industrial revolution. These developments may signal a corresponding decline of the equilibrium rate of business ownership. However, one must also consider the possibility of some overshooting in the decline of actual entrepreneurship rates, as the upsizing of the business sector and the development of relevant institutions (labor market regulation, social security, tax system, educational system) have systematically reinforced each other during the greater part of the last century. During the 1950s and 1960s the

15. See Audretsch, Carree, van Stel and Thurik (2002) for a full account of the correction of disequilibrium.

actual business ownership rate in many countries may well have decreased until below equilibrium.

3.2.3. An Optimum Rate of Business Ownership?

Finally, there are indications that the equilibrium rate may at the same time be an optimum rate. This is implied by recent research findings by Carree, van Stel, Thurik and Wennekers (2002). While using a data panel of 23 OECD countries for the period 1976-1996, they show the rate of business ownership to influence economic growth through deviations from the equilibrium rate. This result supports the view that differences in the business ownership rate across countries matter when explaining economic performance. As a consequence, economies can have either too few or too many business owners and both situations can lead to lower growth rates. In this respect the equilibrium rate may also be viewed as an optimum rate.

3.3 . Synthesis of the Determinants of Entrepreneurship

In our framework, we have defined entrepreneurship as a two-dimensional concept. At the country level, the first (static) dimension refers to the level of business ownership. The second (dynamic) dimension, referring to entrepreneurial behavior, is operationalized by the prevalence rate of nascent entrepreneurship and the start-up rate of new businesses. Both dimensions show significant variation over time as well as across countries. Given the implications of entrepreneurship for economic performance, an explanation of this variation is of great importance. We have developed a framework to provide such an explanation. Both dimensions of entrepreneurship have their roots in individual occupational choice, with links to aggregate conditions.

Two major links between the societal conditions and entrepreneurship are critical to understanding of the model. First, there is the demand-side of entrepreneurship framing the opportunities available to enterprising individuals. Technology and the level of economic development are important, but institutions also matter. Second, there is the supply side, framing the individual preferences and capabilities (skills and resources) of the labor force. The supply side is determined partly by demographic developments and is deeply embedded in a cultural and an institutional context. Given the perceptions of their opportunities and capabilities, and given their preferences, individuals evaluate their occupational choices.

The main sources of variation in entrepreneurship across countries can be traced to differences in the level of economic development, and to cultural and institutional differences. The main reasons for the observed secular

development of entrepreneurship over time probably have to do with trends in the above factors, on the one hand, and with technological development, on the other.

Although there is still no consistent set of explanations for the development of business ownership rates and other measures for rates of entrepreneurship across countries and over time (OECD, 2000:174,187), we assume that the long-lasting decline in business ownership during the first three-quarters of the 20th century and its subsequent revival, are driven by technological and economic factors (Carree, van Stel, Thurik and Wennekers, 2002). We also assume that culture, institutions and the production structure (business ownership rate and size distribution) tend to reinforce one another[16]. During the many years of entrepreneurial decline these mutual reinforcements and feedbacks may have led to the creation of disequilibria in the sense of a shortage of business ownership[17]. Attitudes in most countries became detrimental toward entrepreneurship. Successful business owners as role models for future generations gradually receded from the stage. Instead, managing a large corporation became the dream of the best and the brightest. In many countries fiscal legislation, a growing share of the public sector and increasing regulation of entry to the market reinforced the decline of the small business sector.

In the final quarter of the 20th century, the outlook for entrepreneurship reversed. In addition to the new technological and economic trends of the late 20th century, institutional reforms and cultural developments in several countries played a role in fostering this revival of business ownership, leading to a correction of the earlier state of disequilibria in these nations[18]. Again, feedbacks from the increasing number of business owners and the rising start-up rates will reinforce these cultural and institutional changes. The consequences of entrepreneurship will be dealt with in a sequel to this paper in the present journal (Thurik, Uhlaner, Wennekers, 2003).[19]

4. Application of the framework for economic historical analysis

16. Hofstede (1980:22,233) justifies this assumption.
17. See Carree, van Stel, Thurik and Wennekers (2002), and Audretsch, Carree, Van Stel and Thurik (2002), for some evidence of disequilibrium in several countries.
18. An analysis of the differences in business ownership rate across countries and the role of culture and institutions are presented in Audretsch, Thurik, Verheul, and Wennekers (2002).
19. See Carree and Thurik (2002) for a literature survey of consequences of entrepreneurship for economic growth.

Our framework provides a tool for analysis of the long term entrepreneurial development of nations. We illustrate its application for two historical periods: the Golden Age of the 17th century Dutch Republic and Britain's First Industrial Revolution (1760-1830). Although we will concentrate on the causes of entrepreneurial behavior, its consequences will also be mentioned.

4.1 The Golden Age of the 17th Century Dutch Republic

Indirect evidence supports the conclusion that the Golden Age of the Dutch Republic was an entrepreneurial economy[20] (Klein, 1965:479; Cipolla, 1981:120; Klein and Veluwenkamp, 1993:31-43). During this period, the Dutch Republic also demonstrated relatively rapid economic growth (Klein, 1965:475; Davids, 2000:433-442; De Vries, 2000:452-457).

4.1.1. Aggregate Conditions

Aggregate conditions provided a rich environment for entrepreneurial activities during the 17th century. Technology and science blossomed, offering many opportunities for new economic applications. The experimentalists, such as Huyghens and Leeuwenhoek, and inventors, such as Stevin and Leeghwater, are just a few of the well-known scientists of this period (Cipolla, 1981:120). In this period, the Dutch Republic was viewed as the technological frontier of Europe (De Vries and van der Woude, 1995:798).

The level of economic development offered ample opportunities for entrepreneurship. The Republic's per capita income was much higher than that of other European countries and notably England (De Vries and van der Woude, 1995:722, 814). Population density was another economic factor stimulating entrepreneurial activity. In 1525 about 45% of Holland's population lived in cities, increasing to more than 60% in 1675 (De Vries and van der Woude, 1995:84), an urbanization rate far ahead of the rest of Europe at that time. Urbanization provided accessible markets for final goods and access to production resources. Immigration to Holland of many experienced and wealthy businessmen from the Southern Low Countries, Portugal and other countries in the decades following the fall of Antwerp in 1585 stimulated entrepreneurial activity (Klein and Veluwenkamp, 1993:33-34). In addition, Holland's high standard of living and a relative freedom of religion attracted large numbers of skilled and unskilled laborers throughout the 17th century,

20. The Dutch Republic is also referred to as the Northern Low Countries, the United Provinces or simply as Holland (see Davids and Noordegraaf, 1993:1-2).

further facilitating economic expansion (De Vries and van der Woude, 1995:95-103).

The legal or institutional framework was conducive to both the demand side and the supply side of entrepreneurship. The Northern Low Countries lacked a feudal history; agriculture was based on a tradition of relatively free enterprise (De Vries and van der Woude, 1995:201). During this period the legal framework, including property rights, the monetary system and tax systems were well developed. Also, in comparison with the rest of Europe, the educational system in the Republic was already remarkably mature and literacy was relatively high (De Vries and Van der Woude, 1995:210-212). In particular, legal restrictions on experimenting were relatively absent, and intellectual property rights were secure. A system of granting patents was in place and stimulated actual application of inventions. Additionally, political decentralization and the ensuing competition between cities created a sellers' market for inventors. The number of patents for invention, granted by the States General, peaked between 1600 and 1650 (Davids, 1993:91-97).

Due to competition between cities, municipal government played an active role in stimulating start-ups of new businesses. These stimulants took a wide variety of forms including "bounties, patents, monopolies, cheap loans, tax exemptions, exemptions from civic duties, freedom from rent, free use of city-owned equipment or special arrangements for the provision of labor" (Davids, 1995:168). The highest level of government assistance occurred during the period 1575-1620 and again between 1655 and 1700, after which such assistance programs declined sharply.

As a consequence of these economic conditions, social mobility and job mobility were relatively high, and there was ample opportunity for individual inventiveness and entrepreneurial spirit (De Vries and van der Woude, 1995:199). It has also been hypothesized that the "protestant ethic" of Calvinism stimulated the entrepreneurial economy (Weber, 1958), although according to De Vries and Van der Woude (1995:205-213) much of the capitalist spirit could already be found in the culture of the Low Countries of the medieval period.

4.1.2. Rate of Entrepreneurship

The rate of entrepreneurship in 17th century Dutch Republic cannot be measured statistically. However, there is ample anecdotal evidence of a dynamic society with an entrepreneurial orientation, opportunities exploited for production and marketing of new products and processes, domestically and globally.

Take for instance the Dutch brewing industry. Yntema (1995) analysed the role of entrepreneurship in the transformation of the Dutch brewing industry

between 1500 and 1580, the period just preceding what is usually considered the Golden Age. Yntema describes this period as follows: "Enterprising brewers penetrated new markets, marketing new types of beer and altering traditional market arrangements. Technological change was a hallmark of the brewing industry: the use of new brewing processes spread throughout Holland, the per unit cost of brewing beer declined, and the types of beer that were brewed increased. ... Increased fixed capital investment embodied technological change, allowing brewers to profit from economies of scale" (Yntema, 1995:201).

The wide-ranging business activities of the Trip family provide another example of the dynamic qualities of the period (Klein, 1965). Across several generations and for more than a century, the Trips started and expanded firms in several areas of the economy, including international commerce (arms, tar, iron, copper), various production industries (woolens, salt refinery, gun foundry), ship ownership, land ownership, stock jobbing, and finance and insurance. They participated also in the Dutch East India Company. Their entrepreneurial success pushed "the family fortunes to spectacular heights" (Klein, 1965:474). The successes of another businessman, Louis de Geer, provide one more case example of the vigor of Dutch entrepreneurship in the 17th century. Founder and administrator of an economic empire headquartered in Amsterdam, De Geer is also considered the founding father of the industrial sector in Sweden (Cipolla, 1981; Lindblad, 1995).

In sum, during this period, the Dutch covered the world as explorers, colonists, merchants, consultants and industrialists (Cipolla, 1981).

4.1.3. Economic Performance During the Dutch Golden Age

The scope of the industrial diversification during the Golden Age was far reaching. This period in history witnessed advances in a wide variety of sectors, including agriculture, fishery, construction, manufacturing, shipping and trade as well as a remarkable development of modern services such as finance, insurance, broking and factoring.[21] The macro-economic accomplishments of this capitalist episode are also conspicuous. First of all the period between 1550 and 1675 witnessed a total average population growth of more than 0.3% per annum and an average urban population growth of 0.8% (De Vries, 2000:454). Van Zanden (1993:11) estimates real per capita output growth between 1580 and 1650 to be more than 0.3% per year in the Province of Holland "and perhaps even twice that figure".[22] On the other hand, real wages in Holland remained roughly constant, while real per capita wealth

21. For an extensive account, see De Vries and van der Woude (1995:235-582).
22. These growth rates may seem modest by modern standards, but a lasting combination of population growth with per capita income growth was exceptional in the pre-industrial era.

tripled between 1500 and 1650. Apparently, economic growth in this period was accompanied by a change in the distribution of income between business owners and employed labor.

Population growth can be both a cause and a consequence of economic development, but an economic analysis by De Vries of the period 1580-1620 particularly bears out the job creating effect of the economic development in these years. Considering the concurrent strong rise in the wage for unskilled labor, urban population growth was "more than matched by the expansive growth of employment opportunities as capital was invested across a broad range of commercial and industrial activities" (De Vries, 2000:456).

One explanation for the economic success of the period may be the continuous drive towards higher productivity. During this period, the Dutch were particularly adept at boosting productivity via cost-reducing innovations, while maintaining high wages (Davids, 1993; Klein, 1965; Cipolla, 1981;De Vries and van der Woude, 1995). The innovations are wide ranging, and apply to many industries. For example, in fishing, the Dutch refined techniques for curing herring aboard ship and improved harpoons used for whaling. Agriculture productivity was boosted by fertilization with manure, crop rotation, and application of advanced drainage techniques. In shipping, productivity was improved by the invention of a revolutionary new ship (the fluyt ship) and via advances in navigation techniques and cartography. In shipbuilding, standardized ship design and investments in cranes raised productivity. Innovations in manufacturing were also quite numerous ranging from the use of peat as a source of energy, the widespread use of industrial windmills and the introduction of mechanical devices. Of course, in addition to process innovations there were also many new products and services introduced in this period, including clocks and other precision instruments and the creation of modern share-jobbing.

4.1.4. Conclusion

Historical analysis suggests that entrepreneurship may serve as an important intervening explanatory variable connecting the aggregate conditions and economic development in the Dutch Golden Age. We have no clear evidence to which extent economic progress was due to entry of new businesses and to new investments undertaken by incumbents. There are alternative explanations for the economic prosperity of the period and/or explanations working in tandem with entrepreneurship. For instance, monopolies were permitted and were often critical prerequisites for high investment. However, these monopolistic practices were generally short-term in character (Klein, 1965; Klein and Veluwenkamp, 1993). Also, although the precise importance of scale economies in this period is relatively unknown, many large-scale

businesses, i.e., with more than 50 employees, thrived, for instance in textile manufacturing, industrial paper windmills, brewing, peat cutting and shipbuilding. Moreover, certain political forces boosted the Dutch economy in this period. Some historians argue that the energy and cohesiveness required by the Dutch to resist the power of and to achieve political autonomy from the Spanish Habsburg Empire during the eighty years war (1568-1648) stimulated their fierce mercantilist competitive spirit.[23] In any event, Dutch merchants and statesmen of this period drew together capital and expertise to prey upon the overseas property of Spain and Portugal in Africa, the Americas and Asia (O'Brien, 2000:481). The subsequent permanent presence in Asia in the form of a large Dutch East India Company[24] and the continued role of the Dutch as middlemen in intra-European trade also played an important role in creating the Golden Age.

The neo-classical production function model is an alternative explanation of the key forces affecting economic performance during the Dutch Golden Age – in particular, improved productivity via substitution of labor by large scale capital investment and more efficient energy sources (wind, peat, coal and water). Trade in imports and re-exports augmented the capital available for financing investments and related innovations (Cipolla, 1981:239), while the high real wage rate played a role in triggering these innovations (for an example in the wood sawing industry, see De Vries and van der Woude, 1995:725). Nevertheless, one might argue that these factors are at best the "proximate" causes of economic growth, with entrepreneurship still serving as the crucial intermediate variable linking the underlying conditions to these proximate causes of economic growth (Wennekers and Thurik, 1999; Lewis, 1955; North and Thomas, 1973).

In summary, applying our framework to the Dutch Golden age, we can identify technological, economic, demographic, cultural and institutional factors that played a role shaping both the demand and the supply side determinants of entrepreneurship. Likewise, it appears that entrepreneurial activity stimulated innovation, variety and competition, which in turn, was associated with the economic growth during the period. The 17th century Dutch Republic provides an illuminating historical example of the many forces shaping a strong entrepreneurial economy.

4.2. Britain's First Industrial Revolution (1760-1830)

23. For a description of this war, see (Israel, 1995).
24. This company, the so-called VOC, was in fact the world's largest multi-national company of the 17th and 18th cenuries, employing around 30,000 people worldwide (Gaastra: 11, 86).

We now take a more abbreviated look at another historical period and location, the first Industrial Revolution in Great Britain between 1760 and 1830 (Mokyr, 2000).[25]

4.2.1. Aggregate Conditions

At the end of the 15th century England was still an 'underdeveloped country' in comparison to countries such as Italy, the Low Countries, France and Southern Germany (Cipolla, 1981). Between 1500 and 1700 considerable changes took place. At first English exports were dominated by wool and woolen cloth. After 1550, the many immigrants from France and the southern Low Countries gradually introduced many new products. During this period English society became more receptive to new ideas and cultural influences. Young men were sent abroad to study at foreign universities. By 1700 the legal and institutional conditions had changed considerably, setting the stage for Britain's industrial expansion. Innovations in economic activity were spurred by the elimination of feudalism, the declining power of the guilds, the growth in popularity of the joint stock company and the development of a banking system (North and Thomas, 1973). By this time, England had also developed an efficient set of property rights embedded in common law and had begun to protect proprietary in knowledge with its patent law.

As in the Dutch Golden Age, the technological leadership that Britain showed between 1750 and 1850, is probably a determining factor to explain its success during the First Industrial Revolution. (Mokyr, 1990). In particular, Britain excelled in technically skilled labor and on its supply of entrepreneurs. Its leadership was viewed more in the arena of application and implementation of new innovations rather than in the new discoveries and inventions themselves (Mokyr, 1990).

Finally, during this period, occupational mobility in Britain was relatively high. A free flow of entrepreneurship between lines of business was manifest, and the allocation of resources was more responsive to new opportunities than in other European economies characterized by occupational exclusiveness (Landes, 1969:71). Also in these countries social and psychological attitudes, viewing the family business as a way of life and not as a means to an end, were unfavorable to effective entrepreneurship and competition (Landes, 1969:131-132).

As in the case of Dutch Golden Age, we conclude that in late 18th century Britain demographic, cultural, institutional, technological and economic conditions were conducive to entrepreneurship.

25. For a more detailed description of this period, see Wennekers and Thurik (1999),

4.2.2. Rate of Entrepreneurship and Economic Performance

Statistics about the rate of entrepreneurship in late 18th and early 19th century Britain are scant, but indications of entrepreneurial behavior are widespread. English society showed an ability to give positive and innovative responses to challenges such as increasing competition and scarcity of raw materials. Entrepreneurs adopted new methods of production, diversified into other manufactures and penetrated new markets. Gradually, the English developed a worldwide commercial network. The notable development of international trade, according to Cipolla (1981:295) "proved to be a great school of entrepreneurship".

The Industrial Revolution was both a revolution in production techniques (mechanization) and in organization (the factory system). A great variety of innovations, mutually reinforcing each other, yielded an unprecedented increase in productivity (Landes, 1969:41). The figures presented by De Vries (2000:452) show how British economic growth took off in the early 1700s and accelerated after 1800. The gap with Dutch real wage levels was gradually closed during the 18th century, and for several decades from 1850 onward GDP per capita (in 1985 US dollars) was higher in Britain than in Belgium, France and the Low Countries, though later overtaken by the United States since around 1880.

5. Conclusions and Policy implications

This paper attempts to provide an overview of our current understanding of entrepreneurship at the macro-level of analysis. A growing database documents the occurrence of wide variations in entrepreneurship, both historically and across nations. This paper explores the determinants of such variation. A descriptive framework of entrepreneurship details some of the determinants and intermediate variables. Differences in aggregate conditions, such as technology, level of economic development, institutions, culture, and demography, cause differences in opportunities, resources, skills and preferences with regard to entrepreneurship. These factors are illustrated using two case studies: the Dutch Golden Age of the 17th century, and Britain's First Industrial Revolution (1760-1830).

Where the present paper deals with the determinants of entrepreneurship, a future one will deal with how the different aspects of entrepreneurship (including nascent entrepreneurship, start-up rate and overall business ownership rate) influence economic performance (Thurik, Uhlaner and Wennekers, 2003).

What does our framework have to say to economic policy makers? It certainly does not claim that every 'entrepreneur' is an agent of change,

representing the "persona causa" of the new entrepreneurial economy. In fact, many of the traditional small firms (mom-and-pop businesses) in less developed countries can be characterized rather as obstacles to change than as agents of change. Also, many of the small start-ups in highly developed countries play only a limited role as agents of change and many of them disappear after a short period. Policies providing incentives schemes for new and small firms in general, and taking away impediments for business start-ups, may therefore suffer from decreased probabilities of new firm survival without achieving much transformation towards an entrepreneurial economy. On the other hand, the many thousands of small start-ups created in this way, may function as a seedbed for a small number of successful and innovative new firms. In that vein, there is room for at least two types of additional policy intervention. The first type is policy aimed at promoting the creation of new technology-based firms in new industries. The second type is policy aimed at providing newly created firms, irrespective of their industrial classification, with the financial, organizational and technological resources needed to grow in both domestic and foreign markets. This type of generic policy in particular promotes variation among new businesses, creating the basis for a selection process that may result in new products and approaches. Incumbent firms striving to maintain their competitive position should never be put in a position where they can hamper this selection process.

The industrial transformation of the Western world is shaping the development of capitalism and should trigger a shift in government policies away from constraining entrepreneurship through regulation and public ownership. It should be geared toward a new set of enabling policies fostering small and new firms, entrepreneurship and the creation and commercialization of new knowledge (Audretsch and Thurik, 2001). Which specific policy measures have to be taken is the object of a different study (Verheul, Wennekers, Audretsch and Thurik, 2002). The 1997 Luxembourg summit of the European Union on unemployment proposed several resolutions to spur employment. These resolutions are typical of the politicians' sentiments toward entrepreneurship around the turn of the century. The resolutions dealt with the stimulation of new and young firms in areas like tax deregulation, administrative measures, loan guarantee programs, venture capital, joint venturing, enterprise culture, education and training programs, access to technology and R&D and impact assessment. Embracing these resolutions would be consistent with what we believe to be supported by the research on entrepreneurship and economic development (OECD, 1998; Audretsch, Thurik, Verheul, and Wennekers, 2002). Comparative research across countries ('benchmarking') can make a contribution to the assessment of such policy measures. International comparison can be used to identify 'best practices' in entrepreneurship and small business policy. The value of such benchmarking will be improved if adequate, independent evaluations of the

various policies become available. Moreover, comparative research will help to establish the important but under-researched role of institutions and culture (Stevenson and Lundström, 2001; Uhlaner, Thurik, and Hutjes, 2002).

References

Acemoglu, D., 1995, Reward structures and the allocation of talent, *European Economic Review* 39, 17-33.

Acs. Z.J., 1992, Small business economics; a global perspective, *Challenge* 35, 38-44.

Acs, Z.J., D.B. Audretsch and D.S. Evans, 1994, The determinants of variations in self-employment rates across countries over time, unpublished manuscript.

Acs, Z.J., Carlsson, B., Karlsson, C., 1999, *Entrepreneurship, Small and Medium-Sized Enterprises and the Macroeconomy*. New York/Cambridge: Cambridge University Press.

Atkeson, A. and P.J. Kehoe, 2001, *The transition to a new economy after the second industrial revolution,* NBER Working Paper 8676, Cambridge, MA: National Bureau of Economic Research.

Audretsch, D.B. and M. Fritsch, 2002, Growth regimes over time and space, *Regional Studies*, forthcoming.

Audretsch, D.B., M.A. Carree, A.J. van Stel and A.R. Thurik, 2002, Impeded industrial restructuring: the growth penalty, *Kyklos* 55 (1), 81-97.

Audretsch, D.B., M.A. Carree and A.R. Thurik, 2001, Does entrepreneurship reduce unemployment? Tinbergen Institute Discussion Paper TI01-074/3, Erasmus University Rotterdam.

Audretsch, D.B. and A.R. Thurik, 2000, Capitalism and democracy in the 21st century: from the managed to the entrepreneurial economy, *Journal of Evolutionary Economics* 10(1), 17-34.

Audretsch, D.B. and A.R. Thurik, 2001, What is new about the new economy: sources of growth in the managed and entrepreneurial economies, *Industrial and Corporate Change*, 10(1), 267-315.

Audretsch, D.B., A.R. Thurik, I. Verheul and A.R.M. Wennekers (eds), 2002, *Entrepreneurship: Determinants and Policy in a European-US Comparison*, Boston/ Dordrecht: Kluwer Academic Publishers.

Barnouw, V., 1979, *Culture and Personality*, Homewood, IL: The Dorsey Press.

Barreto, H., 1989, *The Entrepreneur in Economic Theory; Disappearance and Explanation*, London: Routledge.

Baum, J.R., J.D. Olian, M. Erez, E.R. Schnell, K.G. Smith, H.P. Sims, J.S. Scully and K.A. Smith, 1993, Nationality and work role interactions: a cultural contrast of Israeli and U.S. entrepreneurs' versus managers' needs, *Journal of Business Venturing* 8, 499-512.

Bird, B., 1989, *Entrepreneurial Behavior*, Glenview, IL: Scott, Foresman and Company.

Blais, R. A. and J. Toulouse, 1998, National, regional or world patterns of entrepreneurial motivation: an empirical study of 2,278 entrepreneurs and 1,733 non-entrepreneurs in fourteen countries on four continents, *Journal of Small Business and Entrepreneurship* 7, 3-20.

Blanchflower, D. G., 2000, Self-employment in OECD Countries, *Labour Economics* 7, 471-505.

Blanchflower, D. G. and Oswald, A. J., 1994, *The Wage Curve*, Cambridge, MA: MIT Press.

Blau, D., 1987, A time series analysis of self-employment, *Journal of Political Economy* 95, 445-467.

Blau, P. M. and O. D. Duncan, 1967, *The American Occupational Structure*, New York, NY: John Wiley.

Blau, P.M., J. W. Gustad, R. Jesson, H. S. Parnes, and R. C. Wilcox, 1956, Occupational choices: a conceptual framework, *Industrial and Labor Relations Review* 9, 531, 537, 543.

Bosma, N.S. and H.R. Nieuwenhuijsen, 2000, *Turbulence and productivity in the Netherlands*, Research Report 9909/E, Zoetermeer: EIM Business and Policy Research.

Braudel, F., 1982, *Civilization and Capitalism 15th-18th Century*, Vol. II: the Wheels of Commerce, London: Collins.
Brock, W.A. and D.S. Evans, 1989, Small business economics, *Small Business Economics* 1, 7-20.
Bull, I. And G. E. Willard, 1993, Towards a theory of entrepreneurship, *Journal of Business Venturing* 8, 183-195.
Burgelman, R. A., 1984, Designs for corporate entrepreneurship in established firms, *California Management Review* 26(3), 154-166.
Busenitz, L. W., C. Gömez, and J. W. Spencer, 2000, Country institutional profiles: unlocking entrepreneurial phenomena, *Academy of Management Journal* 43(5), 994-1003.
Cantillon, R., 1931, *Essai Sur la Nature du Commerce en Général*, edited and translated by H. Higgs, London: MacMillan.
Carlsson, B., 1989, The evolution of manufacturing technology and its impact on industrial structure: an international study, *Small Business Economics* 1, 21-37.
Carlsson, B., 1999, Small business, entrepreneurship, and industrial dynamics, in Z. Acs (ed.), *Are Small Firms Important?* Dordrecht/Boston: Kluwer Academic Publishers, 99-110.
Carree, M.A., 1997, *Market Dynamics, Evolution and Smallness*, Amsterdam: Thesis Publishers and Tinbergen Institute.
Carree, M.A., A.J. van Stel, A.R. Thurik and A.R.M. Wennekers, 2002, Economic development and business ownership: an analysis using data of 23 OECD countries in the period 1976-1996, *Small Business Economics* 18, forthcoming.
Carree, M.A. and A.R. Thurik, 2000, The life cycle of the U.S. tire industry, *Southern Economic Journal* 67, 254-278.
Carree, M.A. and A.R. Thurik, 2002, The impact of entrepreneurship on economic growth, in D.B. Audretsch and Z.J. Acs (eds.) *Handbook of Entrepreneurship*, Boston/Dordrecht: Kluwer Academic Publishers, forthcoming.
Casson, M., 1995, *Entrepreneurship and Business Culture*; Studies in the Economics of Trust; Vol. 1, Cheltenham, UK: Edward Elgar.
Cipolla, C. M., 1981, *Before the Industrial Revolution; European Society and Economy, 1000-1700*, Cambridge, UK: Cambridge University Press, second edition.
Cooper, C. A. and Dunkelberg, W. C., 1987 Entrepreneurial research: old questions, new answers and methodological issues, *American Journal of Small Business* 1, 11-23.
Davids, K., 2000, From 'golden age' to 'golden age'. an introduction to the role of the Netherlands in economic science and economic history, *De Economist*, 148(4), 433-442.
Davids, C.A., 1995, Beginning entrepreneurs and municipal governments in Holland at the time of the Dutch republic, in C. Lesger and L. Noordegraaf (eds.), *Entrepreneurs and Entrepreneurship in Early Modern Times. Merchants and Industrialists Within the Orbit of the Dutch Staple Market*, Den Haag: Stichting Hollandse Historische Reeks, 167-183.
Davids, K., 1993, Technological change and the economic expansion of the Dutch republic, 1580-1680, in K. Davids and L. Noordegraaf (eds.), *The Dutch Economy in the Golden Age: Nine Studies*, Amsterdam: Nederlandsch Economisch-Historisch Archief, 79-104.
Davids, K. and L. Noordegraaf, 1993, Introduction, in K. Davids and L. Noordegraaf (eds.), *The Dutch Economy in the Golden Age: Nine studies*, Amsterdam: Nederlandsch Economisch-Historisch Archief, 1-3.
Davidsson, P., 1995, Culture, structure and regional levels of entrepreneurship, *Entrepreneurship and Regional Development* 7, 41-62.
Delmar, F., and P. Davidsson, 2000, Where do they come from?: prevalence and characteristics of nascent entrepreneurs, *Entrepreneurship and Regional Development* 12, 1-23.
Drucker, Peter, 2001, The next society; a survey of the near future, *The Economist*, November 3rd 2001.
EIM/ENSR, 1995, *The European Observatory for SMEs; Third Annual Report*, Zoetemeer: EIM Business and Policy Research.
EIM/EZ, 2000, *Entrepreneurship in the Netherlands; Opportunities and Threats to Nascent Entrepreneurship*, Zoetermeer: EIM Business and Policy Research.

Erutku, C. and Vallée, L. 1997, Business start-ups in today's Poland: who and how? *Entrepreneurship and Regional Development 9*, 113-126.
Etzioni, A., 1987, Entrepreneurship, adaptation and legitimation, *Journal of Economic Behavior and Organization 8*, 175-189.
European Commission, 1999, *Action Plan to Promote Entrepreneurship and Competitiveness*, Directorate-General for Enterprise.
Evans, D. S. and L. S. Leighton, 1989a, Some empirical aspects of entrepreneurship, *American Economic Review* 79, 519-535.
Evans, D.S. and L. S. Leighton, 1989b, The determinants of changes in U.S. self-employment, 1968-1987, *Small Business Economics* 2, 319-330.
EZ, 1999, *The Entrepreneurial Society. More Opportunities and Fewer Obstacles for Entrepreneurship*, Den Haag: Ministry of Economic Affairs:.
Freeman, C. and C. Perez, 1988, Structural crises of adjustment: business cycles and investment behavior, in G. Dosi, C. Freeman, R. Nelson, G. Silverberg and L. Soete (eds.), *Technical Change and Economic Theory*, London: Pinter Publishers.
Gaastra, F.S., 2002, *De Geschiedenis van de VOC*, Zutphen: Walburg Pers.
Gavron, R., M. Cowling, G. Holtham and A. Westall, 1998, *The Entrepreneurial Society*, London: Institute for Public Policy Research.
Gelderen, M.W. van, 1999, Ontluikend ondernemerschap, Een studie naar mensen die bezig zijn met het opzetten van een bedrijf (nascent entrepreneurs), *Strategische Verkenning*, Zoetermeer: EIM Business and Policy Research.
Hébert, R.F. and A.N. Link, 1989, In search of the meaning of entrepreneurship, *Small Business Economics* 1, pp. 39-49.
Henrekson, M., 2000, *Personal taxation and the scope for entrepreneurial activity*, Paper presented at the Jönköping International Workshop on 'Institutions, Entrepreneurship and Firm Growth', 13-15 January 2000.
Hofstede, G., 1980, *Culture's Consequences: International Differences in Work-Related Values*, Beverly Hills: Sage.
Hofstede, G., 2001, *Culture's Consequences; Comparing Values, Behaviors, Institutions and Organizations Across Nations*, 2nd edition, Thousand Oaks: Sage.
Huisman, D., 1985, Entrepreneurship: Economic and cultural influences on the entrepreneurial climate, *European Research* 13 (4), 10-17.
Inglehart, R., 1977, *The Silent Revolution: Changing Values and Political Styles among Western Publics*, Princeton, NJ: Princeton University Press.
Inglehart, R., 1990, *Culture Shift in Advanced Industrial Society*. Princeton, NJ: Princeton University Press
Inglehart, R., 1997, *Modernization and Post-modernization: Cultural, Economic and Political Change in 43 Societies*, Princeton, NJ: Princeton University Press.
Inman, R.P. (ed.), 1985, *Managing the Service Economy*, Cambridge: Cambridge University Press.
Israel, J.I., 1995, *The Dutch Republic: Its Rise, Greatness and Fall 1477-1806*, Oxford: Clarendon Press.
Jackson, L.F., 1984, Hierarchic demand and the Engle curve for variety, *Review of Economics and Statistics* 66, 8-15.
Jensen, M.C., 1993, The modern industrial revolution, exit, and the failure of internal control systems, *Journal of Finance* 68, 831-880.
Jovanovic, B., 1993, *The diversification of production*, Brookings Papers: Microeconomics 1993, 197-235.
Kirchhoff, B.A., 1994, *Entrepreneurship and Dynamic Capitalism*, Westport, CT: Praeger.
Kirzner, I.M., 1979, *Perception, Opportunity and Profit: Studies in the Theory of Entrepreneurship*, Chicago: University of Chicago Press.
Kirzner, I.M., 1997, Entrepreneurial discovery and the competitive market process: an Austrian approach, *Journal of Economic Literature* 35, 60-85.
Klein, P.W., 1965, *De Trippen in de 17e Eeuw: Een Studie over het Ondernemersgedrag op de Hollandse Stapelmarkt*, Assen: Van Gorcum.
Klein, P.W. and J.W. Veluwenkamp, 1993, The role of the entrepreneur in the economic expansion of the Dutch republic, in K. Davids and L. Noordegraaf (eds.), *The Dutch*

Economy in the Golden Age: Nine Studies, Amsterdam: Nederlandsch Economisch-Historisch Archief, 27-53.
Klepper, S., 1996, Entry, exit, growth, and innovation over the product life cycle, *American Economic Review* 86: 562-583.
Klepper, S. and E. Graddy, 1990, The evolution of new industries and the determinants of market structure, *Rand Journal of Economics* 21: 24-44.
Klepper, S. and J.H. Miller, 1995, Entry, exit, and shakeouts in United States in new manufactured products, *International Journal of Industrial Organization* 13: 567-591.
Klepper, S. and K.L. Simons, 1993, *Technological change and industry shakeouts*, paper presented at the Third Global Workshop on Small Business Economics, Tinbergen Institute Rotterdam, August 1994.
Knight, F.H., 1921, *Risk, Uncertainty and Profit*, New York: Houghton Mifflin.
Kroeber, A. L. and T. Parsons, 1959, The concepts of culture and of social system, *American Sociological Review* 23, 582-583.
Landes, D.S., 1969, *The Unbound Prometheus; Technological Change and Industrial Development in Western Europe from 1750 to the Present*, Cambridge, UK: Cambridge University Press.
Lee, S. M. and S. J. Peterson, 2000, Culture, entrepreneurial orientation, and global competitiveness, *Journal of World Business* 35(4), 401-416.
Lewis, W. A. (1955), *The Theory of Economic Growth*, London: George Allen & Unwin.
Lindblad, J.Th., 1995, *Louis de Geer (1587-1652); Dutch entrepreneur and father of the Swedish industry*, in C. Lesger and L. Noordegraaf (eds.), Entrepreneurs and Entrepreneurship in Early Modern Times; Merchants and Industrialists Within the Orbit of the Dutch Staple market, Den Haag: Stichting Hollandse Historische Reeks, 77-84.
Lucas, R.E., Jr., 1978, On the size distribution of business firms, *Bell Journal of Economics* 9, 508-523.
Lumpkin, G. T. and G. G. Dess, 1996, Clarifying the entrepreneurial orientation construct and linking it to performance, *Academy of Management Review* 21(1), 1-37.
Maslow, A., 1954, *Motivation and Personality*, New York: Harper and Row.
McClelland, D. C., 1961, *The Achieving Society*. Princeton, NJ: Van Nostrand.
McGrath, R. G. and I. C. MacMillan, 1992, More like each other than anyone else?: cross-cultural study of entrepreneurial perceptions, *Journal of Business Venturing* 7(5), 419-429.
McGrath, R.G., I.C. MacMillan and S. Scheinberg, 1992, Elitists, risk-takers, and rugged individualists?: an exploratory analysis of cultural differences between entrepreneurs and non-entrepreneurs, *Journal of Business Venturing* 7(2) 115-136.
Meager, N., 1992, Does unemployment lead to self-employment? *Small Business Economics* 4, 87-103.
Mokyr, J., 2000, The industrial revolution and the Netherlands: why did it not happen?, *De Economist*, 148(4), 503-520.
Mokyr, J., 1990, *The Lever of Riches; Technological Creativity and Economic Progress*, Oxford, UK: Oxford University Press.
Mueller, S. L. and A. S. Thomas, 2000, Culture and entrepreneurial potential: a nine country study of locus of control and innovativeness, *Journal of Business Venturing* 16, 51-75.
Murphy, K.M., Schleifer, A. and R.W. Vishny, 1991, The allocation of talent: implications for growth, *The Quarterly Journal of Economics* 106, 503-530.
Noordegraaf, L., 1993, Dutch industry in the Golden Age, in K. Davids and L. Noordegraaf (eds.), *The Dutch Economy in the Golden Age: Nine studies*, Amsterdam: Nederlandsch Economisch-Historisch Archief, 131-157.
Noorderhaven, N.G., A.R.M. Wennekers, G. Hofstede, A.R. Thurik and R.E. Wildeman, 1999, *Self-employment out of dissatisfaction*, Erasmus University Rotterdam, Tinbergen discussion paper TI 99-089/3.
Nooteboom, B., 1993, *Schumpeterian and Austrian entrepreneurship: a unified process of innovation and diffusion*, Research report nr.1993-01, Groningen: Groningen University.
North, D.C., 1994, Economic performance through time, *The American Economic Review* 84(3), xx-xx

North, D.C. and R.P. Thomas, 1973, *The Rise of the Western World; a New Economic History*, Cambridge, UK: University Press.
O'Brien, P.K., 2000, Mercantilism and imperialism in the rise and decline of the Dutch and British economies 1585-1815, *De Economist*, 148(4), 469-501.
OECD, 1998, *Fostering Entrepreneurship, the OECD Jobs Strategy*, Paris: OECD.
OECD, 2000, *OECD Employment Outlook*, Paris: OECD.
Phillips, J.D., 1962, *The self-employed in the United States, University of Illinois Bulletin 88*, Bureau of Economic and Business Research, Urbana: University of Illinois.
Pinchot, G., III, 1985, *Intrapreneuring*, New York: Harper and Row.
Piore, M.J. and C.F. Sabel, 1984, *The Second Industrial Divide Possibilities for Prosperity*, New York: Basic Books.
Praag, C.M. van, 1999, Some classic views on entrepreneurship, *De Economist* 147, 311-335.
Purrington, C.A. and K.E. Bettcher, 2001, *From the garage to the boardroom: the entrepreneurial roots of America's largest corporations*, National Commission on Entrepreneurship (www.ncoe.org).
Reynolds, P. D., 1997, Who starts new firms?: preliminary explorations of firms-in-generation, *Small Business Economics* 9, 449-462.
Reynolds, P.D., 2000, Netherlands nascents: entrepreneurship in northern Europe, in EIM/EZ (eds.), *Entrepreneurship in the Netherlands; opportunities and threats to nascent entrepreneurship*, Zoetermeer: EIM Business and Policy Research.
Reynolds, P.D., M. Hay and S.M. Camp, 1999, *Global Entrepreneurship Monitor: 1999 Executive Report*, Kauffman Center for Entrepreneurial Leadership.
Reynolds, P.D., M. Hay, W.D. Bygrave, S.M. Camp and E. Autio, 2000, *Global Entrepreneurship Monitor: 2000 Executive Report*, Kauffman Center for Entrepreneurial Leadership.
Reynolds, P.D., S.M. Camp, W.D. Bygrave, E. Autio and M. Hay, 2001, *Global Entrepreneurship Monitor: 2001 Executive Report*, Kauffman Center for Entrepreneurial Leadership.
Reynolds, P. D., D. J. Storey, and P. Westhead, 1994, Cross-national variations in new firm formation rates, *Regional Studies* 28, 443-456.
Robichaud, Y., E. McGraw and A. Roger, 2001, Toward the development of a measuring instrument for entrepreneurial motivation, *Journal of Developmental Entrepreneurship* 6, 189-201.
Schumpeter, J.A., 1912, *The Theory of Economic Development*, Oxford: Oxford University Press.
Stevenson, H.H. and David E. Gumpert, 1991, The heart of entrepreneurship, in W.A. Sahlman and H.H. Stevenson (eds.), *The Entrepreneurial Venture*, Boston: McGraw-Hill.
Stevenson, L., 1996, The implementation of an entrepreneurship development strategy in *Canada: the case of the Atlantic Region*, Paris: OECD.
Stevenson, L. and A. Lundström, 2001, Patterns and trends in entrepreneurship/SME policy and practice in ten economies, *Entrepreneurship Policy for the Future Series*, Vol. 3, Swedish Foundation for Small Business Research.
Stopford, J. M., and C. W. F. Baden-Fuller, Creating corporate entrepreneurship, *Strategic Management Journal* 15, 521-536.
Storey, D.J., 1991, The birth of new firms-does unemployment matter? A review of the evidence, *Small Business Economics* 3 (3), 167-178.
Storey, D.J., 1994, Understanding the Small Business Sector, London/New York: Routledge.
Storey, D.J., 1999, Six steps to heaven: evaluating the impact of public policies to support small business in developed economies, in D.L. Sexton and H. Landström (eds.), *Handbook of Entrepreneurship*, Blackwell: Oxford, 176-194.
Teece, D.J., 1993, The dynamics of industrial capitalism: perspectives on Alfred Chandler's scale and scope, *Journal of Economic Literature* 31,199-225.
Thurik, A.R., 1996, Small firms, entrepreneurship and economic growth, in P.H. Admiraal (ed.), *Small Business in the Modern Economy*, Oxford: Basil Blackwell Publishers, 126-152.

Thurik, A.R., 1999, Entrepreneurship, industrial transformation and growth, in G.D. Libecap (ed.), The Sources of Entrepreneurial Activity: Vol. 11, *Advances in the Study of Entrepreneurship, Innovation, and Economic Growth*, Stamford, CT: JAI Press, 29-65.

Thurik, A. R., L. M. Uhlaner and S. Wennekers, 2003, Entrepreneurship and economic performance: the macro perspective, *International Journal of Enterprise Education*, forthcoming.

Tiessen, J. H. 1997, Individualism, collectivism, and entrepreneurship: a framework for international comparative research, *Journal of Business Venturing* 12, 367-384.

Uhlaner, L.M., A. R. Thurik, and J. Hutjes, 2002, Post-materialism and entrepreneurial activity: a macro view, Proceedings, *Small Business and Entrepreneurship Development Conference*, University of Nottingham, 15-16 April.

Verheul, I., S. Wennekers, D. Audretsch and A.R. Thurik, 2002, An eclectic theory of entrepreneurship, in D.B. Audretsch, A.R. Thurik, I. Verheul and A.R.M. Wennekers (eds.) *Entrepreneurship: Determinants and Policy in a European-US Comparison*, Boston/ Dordrecht: Kluwer Academic Publishers.

Vries, J. de, 2000, Dutch economic growth in comparative-historical perspective, 1500-2000, *De Economist*, 148(4), 441-467.

Vries, J. de and A. van der Woude, 1995, Nederland 1500-1815; *de Eerste Ronde van Moderne Economische Groei*, Amsterdam: Uitgeverij Balans.

Weber, M., 1958, *The Protestant Ethic and the Spirit of Capitalism*, New York: Charles Scribner & Sons.

Wennekers, A. R. M., 1992, Personal and collective services: trends, growth factors and role, a synthesis, in *Personal and Collective Services: an International Perspective, Economic Commission for Europe, Discussion Papers* 2(1), New York: United Nations, 1-25.

Wennekers, A. R. M., 1999, The revival of entrepreneurship in the Netherlands, in: P.J.J. Welfens and C. Graack (eds), *Technologieorientierte Unternehmensgründungen und Mittelstandspolitik in Europa*, Heidelberg: Physica-Verlag, 185-194.

Wennekers, A. R. M., and A. R. Thurik, 1999, Linking entrepreneurship and economic growth, *Small Business Economics* 13, 27-55.

Wennekers, A. R. M., N. G. Noorderhaven, G. Hofstede and A. R. Thurik, 2001, *Cultural and economic determinants of business ownership across countries*, Paper presented at the Babson Conference, 13-16 June 2001, Jönköping.

Wennekers, A.R.M. and M. Folkeringa, 2002, *The development of the business ownership rate in the Netherlands 1899-1998; a decomposition into sector shift and within sector trends*, Paper submitted to BKERC 2002 Conference, Boulder, Colorado.

Wildeman, R.E., G. Hofstede, N.G. Noorderhaven, A.R. Thurik, W.H.J. Verhoeven and A.R.M. Wennekers, 1999, *Self-employment in 23 OECD countries, the role of cultural and economic factors*, Research Report 9811/E, Zoetermeer: EIM Business and Policy Research.

Yntema, R.J., 1995, Entrepreneurship and technological change in Holland's brewing industry, 1500-1580, in C. Lesger and L. Noordegraaf (eds.), *Entrepreneurs and Entrepreneurship in Early Modern Times: Merchants and Industrialists Within the Orbit of the Dutch Staple market*, Den Haag: Stichting Hollandse Historische Reeks, 185-201.

Zanden, J.L. van, 1993, *Economic growth in the Golden Age; the development of the economy of Holland, 1500-1650*, in K. Davids and L. Noordegraaf (eds.), The Dutch Economy in the Golden Age: Nine Studies, Amsterdam: Nederlandsch Economisch-Historisch Archief, 5-26.