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Defining and Measuring Entrepreneurship

Jens Iversen, Rasmus Jørgensen,
and Nikolaj Malchow-Møller

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Defining and Measuring Entrepreneurship

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Abstract

Although entrepreneurship has become a buzzword in the public debate, a coherent definition of entrepreneurship has not yet emerged. In this paper, we review and compare the most common theoretical definitions of entrepreneurship in economics and discuss their connection to the various empirical measures in use. We argue that entrepreneurship is best considered a multifaceted concept, and that the different empirical measures reflect different aspects of entrepreneurship. The relevance of this exercise is illustrated by the fact that in a cross-country comparison of entrepreneurship, we find that the relative ranking of countries depends crucially on the indicator used.

Keywords: Entrepreneurship; definitions; measurement; cross-country comparison.

JEL code: B10, J2, M13, O3

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1

Introduction

“Entrepreneurship” has become a buzzword in the public debate in recent years. It is extensively referred to by policy-makers as one of the roads to future prosperity, and cross-country comparisons of entrepreneurial activity have become increasingly popular. However, the concept of entrepreneurship is often used without a precise definition, and it may not always be completely clear what the different measures are actually measuring.

In the economic literature, a number of authors have presented rather different definitions of the entrepreneur since the first ideas on entrepreneurship were formulated by Cantillon in the middle of the 18th century. Although 250 years have passed since then, a coherent definition has not yet been agreed upon. While this is bound to complicate theoretical discussions on these issues, the empirical studies also suffer from the lack of a clear theoretically founded definition. Thus, in the empirical literature, numerous different measures of entrepreneurial activity are used, and the relationships to the theoretical ideas are not always obvious.

The purpose of this paper is first to review the most common concepts of entrepreneurship from the theoretical economics

2 *Introduction*

literature, identifying common elements and pointing to important differences. Second, the purpose is to compare these theoretical ideas of entrepreneurship with the measures used in the empirical country-level studies. Since a coherent or unifying definition of entrepreneurship has not emerged, we argue that it is important to be precise about the relationship between the different theoretical aspects of entrepreneurship and the empirical measures. To show this, we compare entrepreneurial activity across the OECD countries using measures that reflect different theoretical aspects. Based on various data sources, we find that the relative ranking of countries is very sensitive to the empirical measure used.

The rest of the paper is structured as follows. In Chapter 2, we review and compare different theoretical definitions of entrepreneurship. In Chapter 3, we relate these to the empirical measures used. Chapter 4 compares the level of entrepreneurial activity across the OECD countries using the different measures and Chapter 5 concludes.

2

Defining Entrepreneurship

Throughout history many scholars have studied the role of the entrepreneur. A review of the most important contributions within this literature is presented in this section. We focus on contributions within (or related to) economics, leaving out definitions from the fields of, e.g., sociology and psychology, but including both general and more model-oriented definitions. We do not intend to provide a detailed account of every definition of entrepreneurship, but try to distil the main elements of the most important contributions in order to identify common features and differences in the literature.¹ As we shall argue, many of these can be illustrated in terms of how the different ideas of entrepreneurship (would) fit into a standard neo-classical model, which today constitutes a common yardstick for economists.

The starting point of our review is the contributions by Cantillon, Say, and Marshall. We then move on to discuss the more recent theories of entrepreneurship. Among these, we concentrate on Schumpeter,

¹For a comprehensive review of some of the classical definitions, see, e.g., Hébert and Link (1988) and Barreto (1989).

Knight, Kirzner, and Schultz, but we also include some more recent contributions by Shane, Venkataraman, and Casson. These theories are then compared to the definition and modeling of entrepreneurs in more formal mathematical (and neo-classical) economic models.

2.1 Early Definitions

According to van Praag (1999), Richard Cantillon was the first economist to acknowledge the entrepreneur as a key economic factor in his posthumous *“Essai sur la nature du commerce en général”* first published in 1755 (Cantillon, 1959).

Cantillon saw the entrepreneur as responsible for all exchange and circulation in the economy. As opposed to wage workers and land owners who both receive a certain/fixed income or rent, the entrepreneur earns an uncertain profit from the difference between a known buying price and an uncertain selling price (Hébert and Link, 1988). Cantillon’s entrepreneur is an arbitrageur, an individual that equilibrates supply and demand in the economy, and in this function bears risk or uncertainty.

Later, Jean-Baptiste Say (1767–1832) provided a different interpretation of the entrepreneurial task (Say, 2001). Say saw the entrepreneur as the main agent of production in the economy. Rather than emphasizing the risk-bearing role of the entrepreneur, Say stressed that the entrepreneur’s “. . . principle quality is to have good judgment.” (Hébert and Link, 1988, p. 38). Say regarded the entrepreneur as a manager of a firm; an input in the production process. The entrepreneur acts in the static world of equilibrium, where he assesses the most favorable economic opportunities. The payoff to the entrepreneur is not profits arising from risk-bearing but instead a wage accruing to a scarce type of labor. Say highlighted, in that way, that the role of the entrepreneur is separated from that of the capitalist.

In his “Principles of Economics,” the early neo-classical economist, Alfred Marshall, also devoted attention to the entrepreneur. In addition to the risk bearing and management aspects emphasized by Cantillon and Say, Marshall introduced an innovating function of the

entrepreneur by emphasizing that the entrepreneur continuously seeks opportunities to minimize costs (Marshall, 1964).²

One way to illustrate the differences between the theories is to try to interpret how they would fit into a standard neo-classical model. Say's entrepreneur is probably most easily incorporated into a neo-classical framework, as he enters the production function directly as a scarce production factor. Although Say's entrepreneur can be associated with an optimizing role as manager, he is not (necessarily) the owner of capital or the firm. In Cantillon's theory, the entrepreneur is not a production factor as such, but an agent that takes on risk and thereby equilibrates supply and demand in the economy. In a neo-classical framework, this function resembles that of the optimizing residual claimant, e.g., the business owner who rents labor and capital from workers and land owners in a world of uncertain demand or production — although this may not fully capture Cantillon's idea of an entrepreneur. Marshall's entrepreneur moves the production possibility frontier (or the cost curve) and can thus be seen as something more than an optimizing business owner or input factor. On the other hand, it is unclear whether Marshall's entrepreneur functions as the residual claimant.

In sum, although it may be difficult to pin down the exact role of the entrepreneur in these early theories since none of them developed a comprehensive theory of entrepreneurship but instead were mainly concerned with the distribution of income, they pointed to a number of different roles for the entrepreneur, including those of an input factor, an optimizing agent, and an innovator. These differences are further developed in later theories where the entrepreneur took center stage with a role critical for the functioning of the economy.

2.2 Schumpeter and Knight

Joseph Schumpeter presented most of his ideas on entrepreneurship in his book *The Theory of Economic Development* published in 1911

²Hébert and Link (1988) argue that Marshall's view on the entrepreneur changed over his life. The cost minimization aspect of the Marshallian theory is emphasized by van Praag (1999).

(Schumpeter, 1949). Schumpeter opposed the existing views of the entrepreneur as a risk bearer and a manager of a company. Instead, Schumpeter argued that an entrepreneur is an *innovator* — an individual who carries out one of the following five tasks³: (1) the creation of a new good or a new quality; (2) the creation of a new method of production; (3) the opening of a new market; (4) the capture of a new source of supply; or (5) the creation of a new organization or industry (Schumpeter, 1949, p. 66). The entrepreneurial task is thus to *identify* new combinations and react to these by exercising the leadership to profit from them. The entrepreneur is not (necessarily) the one who invents new combinations but the one who identifies how these new combinations can be applied in production (Schumpeter, 1949). This line of reasoning implies that a business owner is considered an entrepreneur only if he is “carrying out new combinations.”

An illustration of the role of the Schumpeterian entrepreneur versus that of a manager can be given in terms of the production function. Where the manager combines the input factors in the production function to achieve the highest technical efficiency, the entrepreneur shifts the production function outward by his innovations. Hence, the entrepreneur moves the economic system out of the static equilibrium by creating new products or production methods thereby rendering others obsolete. This is the process of “creative destruction” which Schumpeter saw as the driving force behind economic development (Schumpeter, 1949).

The other main theory of entrepreneurship in the early 20th century was developed by Frank Knight in his *Risk, Uncertainty and Profit*, first published in 1921 (Knight, 1971). An important contribution of Knight was to recognize the distinction between risk and uncertainty. The latter is uninsurable since it relates to unique events, e.g., a shift in consumer taste. According to Knight, the main function of the entrepreneur is to assume the uncertainty related to these events, thereby shielding all other stakeholders against it. I.e., the entrepreneur

³It could be argued that the innovating role of the entrepreneur was already identified — or at least mentioned — by Marshall, see the previous section.

exercises judgment over these unique situations, the uncertainty in the economy, and functions as an insurance agent.

Knight elaborated his theory in the paper *Profits and Entrepreneurial Functions* from 1942 (Knight, 1942). Here Knight explicitly argues that entrepreneurs are owners of companies, i.e., residual claimants, and thus receive profits. In order to earn a positive profit, the entrepreneur carries out three tasks (Knight, 1942): (1) he initiates useful changes or innovations; (2) he adapts to changes in the economic environment; and (3) he assumes the consequences of uncertainty related to the company. Hence, in this later contribution, Knight explains how the uncertainty, which was so important in his 1921 contribution, arises. The argument is that the entrepreneur creates the uncertainty himself, by innovating, or that uncertainty arises as factors exogenous to the company. In both cases, the principle role of the entrepreneur is to assume the consequences of the uncertainty. While the first task mentioned above resembles those of Schumpeter's entrepreneur and can be interpreted as an attempt to encompass this theory, uncertainty bearing remains the identifying feature of the Knightian entrepreneur.

It can be argued that the Knightian theory of entrepreneurship is a refinement of the theory by Cantillon (Hébert and Link, 1988). The latter also argued that entrepreneurship is closely connected to risk/uncertainty but did not recognize the important distinction between the two. However, the Cantillonian entrepreneur is also an arbitrageur who ensures that the economy is in equilibrium — a function which is not entrusted with the Knightian entrepreneur. This equilibrating role of the entrepreneur is instead emphasized by the later theories of Kirzner and Schultz (see below).

The main difference between Knight's and Schumpeter's views on entrepreneurial activity is their view on uncertainty. Knight argues that the key role of the entrepreneur is to assume uncertainty (in accordance with the Cantillonian theory). Schumpeter, on the other hand, leaves the uncertainty-bearing to the banker or capitalist. This implies that Schumpeterian entrepreneurship can arise in an economy without uncertainty and it may be argued that the Schumpeterian entrepreneur is precisely the agent that creates this

uncertainty.⁴ Knightian entrepreneurship is closely connected to owning a business⁵ — the role as residual claimant — but it should be stressed that the entrepreneurial role is to bear the consequences of uncertainty, not to manage. This contrasts with Schumpeter who argues that the entrepreneur is a leader of men but the entrepreneurial activity is innovation, i.e., the ability to carry out new combinations, not the ability/willingness to insure other agents against the consequences of these.

Knight's entrepreneur, in his role of a business owner, can most easily be reconciled with neo-classical theory. However, when describing the entrepreneurial tasks in his later contribution, Knight moves beyond what is typically part of a neo-classical theory of business owners by emphasizing that the entrepreneur is more than a passive optimizing agent, cf. the three tasks above. This could be a consequence of the fact that a passive optimizing firm owner would receive zero profit in a competitive setup, leaving a very limited role for the original Knightian entrepreneur (cf. Baumol, 1968). The Schumpeterian theory is much more difficult to reconcile with the neo-classical paradigm. In the Schumpeterian theory, the entrepreneur moves the economy out of the static equilibrium. If anything, we can interpret Schumpeterian entrepreneurship as a change in the production function or, more specifically, total factor productivity; the extraordinary something that increases output using the same amounts of input. Neo-classical theory concentrates on equilibrium outcomes and, in this respect, has difficulty in incorporating a disequilibrating entrepreneur.

2.3 Kirzner and Schultz

After World War II, mainstream economics became increasingly focused on equilibrium analysis, often in neo-classical frameworks inspired by Walras' static general equilibrium model. As argued by, e.g., Baumol (1968) and discussed above, this model leaves only lit-

⁴ Hébert and Link (1988) make this argument building on the work of Schultz (1975).

⁵ However, the reverse is not true; not all entrepreneurs are business owners. For instance a manager can be entrepreneurial if his judgment is subject to uncertainty and that he assumes the responsibility for possible errors (Hébert and Link, 1988).

tle room for Schumpeterian entrepreneurs and is difficult to reconcile with many of the early theories of entrepreneurship. This is perhaps the reason why the main contributions to entrepreneurship theory continue to be developed outside a standard neo-classical framework. Some of the most prominent of these are Kirzner and Schultz who argue that entrepreneurs deal with situations in which the economy is in disequilibrium.⁶

Kirzner (1973) is a modern exposition of an Austrian approach to entrepreneurship.⁷ He criticizes neo-classical economics along two dimensions. First of all, he rejects the idea that the economy is in equilibrium. Second, he argues that equilibrium analysis should incorporate a theory of how the economy converges to equilibrium. Kirzner argues that the economy is in a constant state of disequilibrium due to shocks constantly hitting the economy. Furthermore, economic agents suffer from “utter ignorance” — they simply do not know that additional information is available.⁸ In this world, the alert entrepreneur discovers and exploits new business opportunities and eliminates (some of the) “utter ignorance” and thus moves the economy toward equilibrium, which is the state where no more information can be discovered.

Schultz (1975) also argues that entrepreneurship is closely connected to situations of disequilibria and that entrepreneurship is the ability to deal with these situations. In disequilibrium, agents are acting sub-optimally and can reallocate their resources to achieve a higher level of satisfaction. Entrepreneurship is the ability to coordinate this reallocation efficiently, and it follows that agents have different degrees of entrepreneurial ability. Contrary to Kirzner, Schultz argues that, in disequilibrium, individuals know that opportunities to increase satisfaction exist but the reallocating process requires time. A better allocation

⁶ Kirzner and Schultz were not the first scholars to recognize the entrepreneur as an equilibrating agent. John Bates Clark had been a proponent of this argument in the early 20th century (see Hébert and Link, 1988), and also Cantillon had expressed such ideas (see above).

⁷ For a recent exposition see Kirzner (1997).

⁸ There is a slight but important difference between “utter ignorance” and imperfect information. Models of imperfect information build on the assumption that agents know that more information is available but refrain from further information gathering since this is costly. “Utter ignorance” is a state where individuals do not know that more information is available and therefore do not collect more information.

of resources can be achieved either by experimenting (trial and error) or by investing in human capital. Schultz argues that entrepreneurship exists in all aspects of life. Thus, housewives and students are entrepreneurs when reallocating their time for housework or student activities (Schultz, 1975). Furthermore, since entrepreneurship is an ability that can be augmented by investment, Schultz argues that a market for entrepreneurship exists and that it is possible to analyze entrepreneurship within the conventional supply and demand framework (Hébert and Link, 1988).

Despite the differences in terms of whether regular supply and demand curves exist in the market for entrepreneurship, there are substantial similarities between Kirzner's and Schultz' theories. They both emphasize that economies are characterized by disequilibria and that entrepreneurship is the ability to deal with these situations. As a result, the Kirznerian and Schultzian entrepreneur is an equilibrating agent in the economy.

The similarities between Kirzner's and Schultz' theories on one hand and Schumpeter's on the other also appear substantial, especially with respect to the tasks performed by the entrepreneur. All three theories recognize that the entrepreneur identifies or discovers business opportunities. While Schultz defines opportunities generally, these are characterized more narrowly by Schumpeter as innovations, which move the economy away from equilibrium. Under Kirzner's and Schultz' disequilibrium assumption, opportunities arise when information is revealed. Individuals react to these opportunities by changing behavior and acting differently. This process can be compared to the Schumpeterian innovative process that also involves doing things differently. However, as opposed to Schumpeter's entrepreneur, Kirzner's and Schultz' entrepreneur moves the economy *toward* equilibrium.

2.4 Recent Theories

Recent theories of entrepreneurship build on the works described above. Shane and Venkataraman (2000) state that "entrepreneurship involves the nexus of two phenomena: the presence of lucrative opportunities and the presence of enterprising individuals" (Shane and Venkatara-

man, 2000). Their theory is inspired by the Kirznerian entrepreneurial discovery process but they emphasize that prior information is needed to complement the new information in the discovery of business opportunities. In this respect, they are similar to Schultz who argues that human capital is an important determinant of entrepreneurial ability.

Casson (2003) tries to encompass both the Schumpeterian and the Knightian definitions by arguing that entrepreneurs are individuals who specialize in decision making. The Schumpeterian entrepreneur applies information about inventions to create new combinations and is ultimately the one who decides if the new combinations are profitable. The Knightian entrepreneur assesses the unique situations arising in the future and makes decisions about how to exploit these situations to make a profit. However, while it is true that both the Knightian and the Schumpeterian entrepreneurs are decision makers, many decision makers are not entrepreneurs according to their theories.

2.5 The Entrepreneur in Economic Modeling

Earlier we have used the neo-classical model or framework to interpret and illustrate differences between the many theories of entrepreneurship. Over the last 30 years, entrepreneurship has in fact been introduced in formal neo-classical models in the literature.

The focus in many of these models is on the division of individuals into different occupations, workers and entrepreneurs, and the resulting equilibrium distribution of firms. The dominating way of incorporating entrepreneurship is to assume that individuals are heterogeneous with respect to so-called “entrepreneurial ability.” This entrepreneurial ability then enters as a parameter in the cost function as in Jovanovic (1982) and Brock and Evans (1986), or as a parameter in the production function, as in Lucas Jr. (1978), Calvo and Wellisz (1980), Evans and Jovanovic (1989), Holmes and Schmitz (1990), Borjas (1999), Buera (2003), and Lazear (2004). This way of modeling entrepreneurship may capture Say’s and to some extent Knight’s ideas of an entrepreneur. Those with the highest entrepreneurial abilities end up as business owners or managers (the entrepreneurs).

A smaller number of models have more explicitly tried to formalize the Knightian ideas of entrepreneurship by focusing on the risk-bearing aspect. In Kihlstrom and Laffont (1979), individuals are modeled as being heterogeneous with respect to risk aversion. Assuming that insurance markets are imperfect implies that the least risk averse individuals end up as entrepreneurs, i.e., owners of firms. Another paper that assumes differences in risk aversion is that of Kanbur (1979). Thus, these papers interpret Knight's idea of risk-bearing entrepreneurs as individual difference in the *willingness* to bear risk and this in turn determines who will eventually become entrepreneurs.

Another interpretation of the Knightian entrepreneur is provided by de Meza and Southey (1996), who assume that individuals have identical abilities, but differ in their perception of the risks involved in owning a business. This implies that the overly optimistic individuals become entrepreneurs. Hence, in this case risk-bearing is not motivated by lower risk aversion but by a different *perception* of risk.

Very few models have tried to endogenize the entrepreneurial ability. An exception is Otani (1996), where the entrepreneurial (managerial) ability is modeled as an endogenous choice of the company. In his framework, managers are hired as apprentices and the longer they remain apprentices, the more able they become. This approach to entrepreneurial ability captures an important aspect of Schultz' theory, where entrepreneurial skills are a sort of human capital that can be acquired through, e.g., education.

While many of the general theories of entrepreneurship from the previous sections focus on a role of the entrepreneur that goes beyond that of a residual claimant (business owner) and/or an input in the static production function, most mathematical models of entrepreneurship treat it exactly as this. The mathematical models have come some way in capturing the Knightian approach to entrepreneurship, although most of these models treat risk differently than Knight, in that the probability distribution of the shocks is typically assumed to be known. Much less progress has been made when it comes to the Schumpeterian entrepreneur. The closest we get to Schumpeterian models are within the endogenous growth theory. Here, the entrepreneurial activity is modeled as innovations arriving according to a stochastic process,

i.e., the entrepreneurial activity is exogenous to the model and is not necessarily associated with an agent or individual, see, e.g., Aghion and Howitt (1997).

Kirzner's and Schultz' ideas of entrepreneurship are even harder to capture in formal mathematical models. The reason is that they see the economy as being constantly in disequilibrium, whereas the neo-classical model assumes that the economy is in equilibrium. The equilibrating role in the neo-classical theory is taken care of by the price mechanism or the "Walrasian auctioneer." This leaves little room for Kirznerian and Schultzian entrepreneurs.

2.6 Discussion

"Entrepreneurship" is frequently advocated in the public debate as a key economic factor. However, often we do not know the precise meaning of the word. In this section, we have tried to look at different uses of the word in the theoretical literature — including the classic and modern definitions as well as the usage in formal models.

Already in the old (pre-1900) literature, many functions were assigned to the entrepreneur, including risk-bearing (Cantillon), management (Say), and innovation (Marshall). Schumpeter confined the role of the entrepreneur to that of innovative activities, whereas Knight stressed the uncertainty-bearing aspect and hence the entrepreneur's role of providing insurance in the economy. Kirzner and Schultz describe entrepreneurs as agents that react to economic opportunities in a world of constant change and therefore work to bring stability (equilibrium) to the economic system. The more recent contribution of Casson emphasizes that entrepreneurs are decision-makers.

Most of the theories regard entrepreneurship as "something more" than an input factor in production. Only Say's managerial entrepreneur fit readily into the neo-classical production function. The question is then if this "something more" has some similar characteristics across the various definitions of entrepreneurship. The answer is, in general, no. The majority of scholars assign different roles to the entrepreneur and thus provide (to some extent) competing theories of entrepreneurship. While the entrepreneur can be interpreted as the residual claimant

in some of these theories, most of them are harder to reconcile with standard neo-classical theory.

The lack of consensus in this area is exemplified by a number of OECD reports where entrepreneurship is defined from a pure Knightian perspective, "...an entrepreneur is anyone who works for himself or herself but not for someone else..." (OECD, 2001b, p. 23), over a Kirznerian approach where the entrepreneur has "...the ability to marshal resources to seize new business opportunities..." (OECD, 1998, p. 41) toward a Schumpeterian inspired definition where entrepreneurship is "the dynamic process of identifying economic opportunities and acting upon them by developing, producing, and selling goods and services" (OECD, 1997, p. 151).

Following Audretsch (2002), we argue that the absence of a generally accepted definition of entrepreneurship reflects that it is a multidimensional concept, involving aspects of uncertainty-bearing, innovation, opportunity-seeking, management and enterprising individuals.

The relationship between the various theories of entrepreneurship can be illustrated by the introduction of the personal computer (PC). We imagine that the market is initially in equilibrium. The invention of the PC and its introduction into the market can be characterized as a Schumpeterian innovation. This creates disequilibrium in the market and therefore market opportunities. Kirznerian and Schultzian entrepreneurs react to these opportunities and introduce their own PCs as well as other products, e.g., processors, chipsets, mice, cables etc. The firms are all subject to shocks that are impossible to diversify implying that the owners are Knightian entrepreneurs. If we suppose that no other shocks hit the economy — or that the probability distribution of shocks become known, such that they can be diversified — the Knightian entrepreneur disappears and enterprising individuals turn into entrepreneurs in the sense of Say; they become managers.

This example shows that Schumpeterian entrepreneurship is concentrated at the beginning of the product or market's life cycle while Knightian entrepreneurship may be found when the product/market has evolved from the initial phase. Knightian entrepreneurship requires that the consequences of shocks cannot be diversified, i.e., true uncertainty is present. Kirznerian and Schultzian entrepreneurship is found

when the market is in disequilibrium and disappears when the economy converges to equilibrium where all information is common knowledge. The entrepreneur in Say's theory exists both before and after the innovation since he is manager and thus an input factor in production.

The causes and consequences of entrepreneurship are also different in the various theories. The Schumpeterian entrepreneur innovates thereby pushing the economy out of the static equilibrium with economic growth in his wake. The Knightian entrepreneur, on the other hand, insures other agents against the consequences of unique events, whereas the Kirznerian entrepreneur moves the economy toward an equilibrium that is never reached. As a consequence, the appropriate set of instruments for entrepreneurship policy will depend on the aspect of entrepreneurship in question. While extended credit access or a less restrictive bankruptcy legislation may stimulate Knightian entrepreneurship, R&D infrastructure or subsidies may be much more relevant as a stimulus of Schumpeterian entrepreneurship. This implies that it is crucial to be precise about which kind of entrepreneurship is considered in a given context.

Finally, the differences in theoretical definitions spill over into the empirical measures of entrepreneurship and can possibly explain the multitude of measures in use. In the next chapter, we consider how the different measures in use reflect the theoretical ideas, and how this matters for cross-country comparisons of entrepreneurial ability.

3

Measuring Entrepreneurship

Given the disagreement among scholars on the definition of entrepreneurship, is it then possible to measure the level of entrepreneurial activity? Clearly, the answer to this question is not straightforward and we need to address several issues before we may provide a satisfactory response.

As argued above, entrepreneurship is probably best considered a multifaceted concept which implies that it is not possible to construct an aggregate measure reflecting the “total” amount of entrepreneurial activity in a given area. For instance, even if we could count the number of innovations made by the entrepreneurs *and* measure the amount of uncertainty-bearing by entrepreneurs, no aggregate measure of entrepreneurship can be combined from these two indicators. We would be comparing apples and oranges.

However, the use of specialized measures may enable us to identify some dimensions of entrepreneurship and then compare the level of entrepreneurial activity across areas in one dimension at a time. In fact, this describes the current state of research in which a multitude of measures of entrepreneurship are used.

Using a specialized measure complicates the empirical analysis for (at least) two reasons. First, since many dimensions of entrepreneurship described in the theoretical literature are not quantifiable, or are imperfectly measured, researchers need to be precise about what dimension of entrepreneurship that is actually analyzed in a given context. Second, any empirical study trying to measure the “total” amount of entrepreneurship needs to consider a wide range of indicators in order to measure as many dimensions of entrepreneurship as possible.

The aim of this chapter is to review the measures of entrepreneurship available in the literature *and* relate these indicators to the economic theories of entrepreneurship in order to discuss what is actually being measured. Also, we present some new indicators of entrepreneurship which may better capture Schumpeterian and Kirzernian entrepreneurship using the European Community Household Panel (ECHP). The empirical exercise in Chapter 4 shows that *measurement matters a great deal* when different measures of entrepreneurship are compared across a group of countries.

3.1 The Self-Employment Rate

The starting point is the overall rate of self-employment, defined as the number of self-employed relative to the labor force. The self-employment rate has been used to compare entrepreneurship across countries by, e.g., Acs et al. (1994), Blanchflower (2000), Blanchflower (2004), Le (1999), OECD (1998), OECD (2000), Parker (2004) and Parker and Robson (2004).¹ Note that there is some disagreement in the literature on what to use in the denominator when computing the self-employment rate. For instance, Blanchflower (2004), Le (1999), OECD (1998), and OECD (2000) use total employment, while Parker (2004) and Parker and Robson (2004) use the labor force.

As seen in the first column of Table 3.1, the Mediterranean countries, Mexico and Korea have the highest self-employment rates among the OECD countries, whereas the countries of Central Europe and the

¹In addition, a huge literature on the determinants of entrepreneurship in individual countries and regions uses this measure as the variable of interest. See Le (1999) for an overview and Blanchflower (2000, 2004) for extensive lists of references.

Table 3.1 Self-employment rates in OECD countries.

	Self-employment rate ^a (2002)	Non-agricultural self-employment rate ^b (2002)	Non-agricultural self-employment rate ^c (2001)	Non-agricultural business owner- ship rate (2002) ^d
Australia	13.8	12.1	—	18.9
Austria	11.0 ^e	7.8 ^e	7.5	11.8
Belgium	15.1 ^f	14.1 ^f	10.4	15.9
Canada	9.6	8.7	—	16.3
Czech Republic	15.6	15.6	—	—
Denmark	8.3	7.2	5.1	10.1
Finland	12.4	9.3	10.4	12.3
France	8.7	6.7	6.6	12.6
Germany	10.0	9.5	8.4	11.2
Greece	34.7	26.4	24.8	27.8
Hungary	13.4	11.8	—	—
Iceland	16.4	13.8	—	17.5
Ireland	17.0	12.7	9.0	15.8
Italy	24.6	23.2	20.9	24.8
Japan	11.2	9.1	—	11.0
Korea	30.4	26.0	—	—
Luxembourg	5.9	5.1	6.1	6.9
Mexico	31.8	27.2	—	—
Netherlands	11.1	9.9	5.5	13.1
New Zealand	18.7	15.8	—	20.8
Norway	6.8	4.9	—	9.7
Poland	24.0	12.1	—	—
Portugal	25.3	17.7	16.8	19.4
Slovak Republic	8.5	8.6	—	—
Spain	17.8	15.7	13.8	18.3
Sweden	9.5	8.5	9.9	12.9
Switzerland	9.7	—	—	10.3
Turkey	37.8 ^e	24.0 ^e	—	—
UK	11.5	11.0	11.9	12.8
USA	7.2	6.4	—	11.8

Notes: ^aSelf-employed proportion of total employment; ^bNon-agricultural self-employed in proportion of non-agricultural employment; ^cNon-agricultural self-employed in proportion of labor force (excluding agriculture); ^dProportion of non-agricultural business owners in non-agricultural employment (hunting, forestry and fishing are also excluded); ^e2001 and ^f1999.

Sources: Blanchflower (2004); ECHP; and <http://www.entrepreneurship-sme.eu>

Nordic countries are all found below or at the median of the sample. No distinct picture seems to emerge with respect to the Eastern European and the Anglo-Saxon countries. One notable feature of Table 3.1 is, however, that the US economy does not appear to be especially entrepreneurial in terms of the self-employment rate in contrast to its reputation of being the world's leader in entrepreneurship.

The extensive use of the self-employment rate is mainly due to the availability of this measure in most countries. But what is actually included in the definition of the self-employed? The OECD Labor Force Statistics define individuals as self-employed if they work for profit or family gain given in cash or in kind, whereas employees work for a wage or a salary, cf. OECD (2005a).

According to OECD (2000), the OECD Labor Force Statistics collect their information from household interview surveys where the interviewee's main occupation is determined by selecting one of the following categories: (1) employee; (2) employer; (3) own-account worker; (4) member of producers' co-operatives; (5) contributing (or unpaid) family worker; and (6) worker not classifiable by status.²

The OECD Labor Force definition indicates that employers, own-account workers, and unpaid family workers should be characterized as self-employed since they work for profit or family gain. However, OECD (1998) and OECD (2000) exclude unpaid family workers from the self-employment rate, arguing that these individuals are assistants of entrepreneurs and not entrepreneurs themselves. Blanchflower (2000) argues, on the contrary, that it may not be appropriate to leave out unpaid family workers just because they are remunerated in some other way, e.g., through a future ownership share in the family business. The issue of unpaid family workers seems to be important as an average of 11.6% of the self-employed in 1996 are unpaid family workers and Blanchflower (2000) reports considerable differences in this number across countries.³

Another potential limitation of the OECD self-employment rate is that it may not include all owners of incorporated businesses. These individuals are, in legal terms, employees of the corporation and may therefore identify themselves as employees in the household survey interviews. To address this problem, OECD (2000) defines *owner-managers* as individuals with a job in an incorporated business

² The ECHP is designed in a similar way, although this survey does not discriminate between employers and own-account workers as they only consider self-employed.

³ According to Blanchflower (2000), 33.6% of the self-employed in Japan are unpaid family workers; USA (1.7%), Canada (3.7%), Australia (6.1%), Germany (12.9%), Italy (14.0%), Denmark (10.6%), Finland (4.6%), Iceland (2.3%), Ireland (5.1%), Netherlands (9.6%), Norway (10.3%), Portugal (5.8%), Spain (14.3%) Sweden (3.4%).

who: (a) have controlling ownership of the enterprise; or (b) have the authority to act on its regard with respect to contract negotiation with other firms and employees. The problem is that in some countries, owner-managers are classified as self-employed and in other countries as employees. For instance, the labor force surveys in Australia, Japan, Norway and the United States use a narrow definition of the self-employed which excludes the owner-managers, whereas most European countries include these individuals as self-employed, cf. OECD (2000). Unfortunately, OECD (2000) does not report separate numbers for the owner-managers, employers and own-account workers for each country. This is potentially important as *owner-managers* constitute, e.g., 31.4% of the self-employed in the United States (OECD, 2000).

Furthermore, because the OECD Labor Force Statistics categorize individuals according to their main job, the wage workers with self-employment as their secondary occupation are not included in the numerator when estimating the self-employment rates. According to Meyer (1990), the employed with a side business amount to 24.6% of the individuals whose main occupation is self-employment in the United States.

The before-mentioned self-employment rate from Table 3.1 includes all sectors. However, most empirical cross-country studies on entrepreneurship exclude the agricultural sector since the farming business is influenced by heavy subsidies, historic traditions of family ownership, and a relative high proportion of unpaid family workers compared to the rest of the economy (Blanchflower, 2000; Parker and Robson, 2004). However, while the average difference between the aggregate self-employment rate and the non-agricultural self-employment rate is small in Table 3.1 (3 percentage points), the discrepancy between these two measures tend to be large when the self-employment rate is large. For instance, the Turkish self-employment rate is approximately cut by a third when the agricultural sector is removed from the analysis.⁴

⁴ Furthermore, when identifying time trends in the self-employment rate, Blanchflower (2000) notes that the overall self-employment rate has been decreasing for most OECD countries in the last 30 years, whereas the opposite is the case for the non-agricultural self-employment rate.

The self-employment rate is a widely used measure of entrepreneurship, but what dimension of entrepreneurship is it actually measuring? The crucial conceptual difference between self-employment and ordinary employment lies in the type of remuneration received, where the self-employed remuneration is uncertain. Hence, the OECD definition of the self-employed is closely related to the Knightian entrepreneur who, in his role as residual claimant, assumes all the uncertainty connected with the firm, thereby leaving all other stakeholders insured. In principle, all individuals who own (shares in) a business are entrepreneurs in the Knightian sense. For practical purposes, we must, however, require that an owner faces substantial uncertainty in order to be characterized as a Knightian entrepreneur.

In situations with no or little uncertainty, the self-employed is closer to Say's entrepreneur, the manager, than the Knightian uncertainty-bearer. However, a business-owner does not need to be a manager since managers can be hired without reducing the true uncertainty.

Clearly, the self-employed are only a subset of the Knightian entrepreneurs in the economy and a measure that includes business owners may better proxy the number of Knightian entrepreneurs in a given area.

Taken at face value, the definition of the self-employment rate allows no inference to be drawn about Schumpeter's innovative entrepreneurship. Nothing guarantees that individuals working for profit or family gain are engaged in any of the five tasks characterizing Schumpeterian entrepreneurship. According to the OECD definition, self-employed individuals are motivated by profit and business opportunities in accordance with Kirzner's definition of entrepreneurship. Under this interpretation, the self-employment rate may also be a measure of the degree of Kirznerian entrepreneurship in the economy.

In sum, the self-employment rate is widely used as a measure of entrepreneurship, primarily for its availability and partly due to the similarity of definitions across countries (Audretsch, 2002). The definition of self-employment comes close to the theories of Knight but is also compatible with the entrepreneur of Say and Kirzner. As only a small fraction of the self-employed are innovative (Audretsch, 2002) the

self-employment rate is not an appropriate indicator of Schumpeterian entrepreneurship.

3.2 Modifications of the Self-Employment Rate

In this section, we present some indicators based on disaggregations of the self-employment rate. We seek to construct the indicators such that they better capture other aspects of entrepreneurship, in particular the innovative aspects. While such indicators have not received much attention in the literature, the relevance of this exercise has been suggested by, e.g., Blanchflower (2000). In order to construct these more specialized measures, we exploit the detailed individual-level information on the self-employed available in the European Community Household Panel (Eurostat, 2001).

The Schumpeterian entrepreneur is an innovator. Furthermore, prior information and human capital are essential for the entrepreneurial discovery process as stressed by Schultz (1975) and Shane and Venkataraman (2000). Therefore, we may expect that individuals with more human capital are more capable of identifying and exploiting business opportunities and thus of innovating. Schultz explicitly argues that investment in human capital increases the entrepreneur's ability to discover new opportunities. Following this argument, we should expect to find more Schumpeterian and/or Schultzian entrepreneurs among the highly educated self-employed. Some support for this assumption is given in Audretsch (2002), who reports that growth rates of companies are positively linked to the human capital of the founder, especially within innovative sectors.

As a measure of human capital, we may use the level of education. Table 3.2 presents the high-skilled self-employment rate defined as self-employed with tertiary education relative to the labor force. This indicator suggests different conclusions compared to those drawn from the overall self-employment rate in Table 3.1.⁵ The relative positions

⁵One might worry that the alternative ranking of countries is a feature of the ECHP database and not the measure per se. However, the ECHP and OECD self-employment rates are very close when comparing columns two and three in Table 3.1, although the ECHP rates are somewhat smaller for Belgium, the Netherlands, and Ireland. The ranking of countries can therefore safely be attributed to the construction of the indicator.

Table 3.2 High-skilled self-employment and self-employment in low- and high-skilled sectors, 2001.

	High-skilled self-employment rates ^a	Self-employment rates in low-skilled sectors ^b	Self-employment rates in high-skilled sectors ^b	Overall self-employment rates ^b
Austria	0.015	0.091	0.094	0.092
Belgium	0.058	0.175	0.075	0.136
Denmark	0.018	0.077	0.046	0.063
Finland	0.028	0.144	0.095	0.127
France	0.020	0.100	0.043	0.078
Germany	0.035	0.102	0.104	0.103
Greece	0.052	0.375	0.193	0.332
Ireland	0.021	0.138	0.094	0.123
Italy	0.029	0.334	0.263	0.313
Luxembourg	0.025	0.091	0.058	0.078
Netherlands	—	—	—	0.066
Portugal	0.017	0.252	0.124	0.224
Spain	0.035	0.229	0.124	0.196
Sweden	0.035	0.156	0.120	0.142
UK	0.057	0.181	0.118	0.155

Notes: ^aNumber of high-skilled self-employed relative to the labor force; ^bSelf-employed proportion of total employment.

Source: European Community Household Panel (ECHP).

of the Mediterranean countries decline, with Portugal now being one of the least entrepreneurial countries in the sample. The positions of the Central European countries are also more scattered with Belgium and Germany as some of the most entrepreneurial but Austria and France as some of the least. The ranks of the Nordic and Anglo-Saxon countries are not changed substantially, except for UK which now becomes one of the most entrepreneurial countries.

Conditioning the overall self-employment rates on educational attainment need not be the optimal way of identifying innovative activities as some highly educated self-employed could be performing non-innovative functions. For example, professionals like doctors, dentist, lawyers and accountants, may not be particularly innovative but are still included in this measure. Furthermore, this indicator may be biased by the general education level in a country.

Alternatively, we may argue that innovative activities are concentrated, or particularly important, in skill-intensive sectors. For instance, if skill-intensive sectors introduce a larger amount of new products

and/or markets, Schumpeter's process of creative destruction may be concentrated in these sectors. In that case, it is perhaps more interesting to look at self-employment rates in these sectors.

Using a 17-sector classification and dropping four public sectors, the skill-intensive sectors were chosen as the five sectors with the largest skill-intensities across countries.⁶ Table 3.2 shows that the self-employment rates in the low-skilled sectors turn out to be closely related to the overall self-employment rates. When it comes to self-employment in the high-skilled sectors, rates are generally lower and the absolute differences across countries are smaller.

Furthermore, we observe that the differences between self-employment in low and high-skilled sectors vary across countries. For instance, Belgium and France have relatively low self-employment rates in the high-skilled sectors compared to those in the low-skilled sectors, whereas the opposite holds for Germany and Austria. This is quite interesting given that the overall self-employment rates do not differ substantially between the four countries. Moreover, it is interesting to note that some of the most entrepreneurial countries according to the overall self-employment rate, Greece and Portugal, have a larger discrepancy between the self-employment rates in the two types of sectors than most other countries.

3.3 The Business Ownership Rate

As argued above, the self-employment rate is an imperfect measure of business owners as it may not include owners of incorporated businesses. The amount of Knightian entrepreneurship may therefore be underestimated by the self-employment rate. A set of alternative measures have been suggested by Meyer (1990) who calculates the self-employment rate as the number of business owners divided by the total non-agricultural employment and Gartner and Shane (1995) who use the number of firms per capita. A similar measure has been used by Audretsch and Thurik (2001), Wennekers et al. (2002), Carree and

⁶The skill-intensity of a sector is calculated as the share of highly educated individuals in total employment in the sector, relative to the share of highly educated in total employment. See Appendix for details.

Thurik (2003) and Carree et al. (2002) who use an international data set of business owners which includes the self-employed and the owner-managers.⁷ However, the inclusion of owners *and* managers may overestimate the number of Knightian entrepreneurs since managers do not necessarily bear any uncertainty.

As seen in Table 3.1, the non-agricultural business ownership rate is larger than the self-employment rate for all countries simply due to the broadening of the concept of business owners. The inclusion of these does not change the conclusions drawn from the non-agricultural self-employment rate with respect to the ranking of countries, except that Australia, Canada, France, and the United States are found to be relatively more entrepreneurial.

3.4 Entry and Exit Rates

The different self-employment rates presented so far are all stock measures based on the number of self-employed individuals relative to the labor force or total employment at given point in time. As such, they are mostly of a Knightian nature, as he saw entrepreneurship as closely related to the business owner. An alternative group of indicators which are often used in the literature are based on *changes* in self-employment or the number of firms, i.e., flow measures. Such measures are more in the spirit of Schumpeterian innovative entrepreneurship or Kirzner's opportunity-seeking entrepreneurs, as they reflect "changes."

The most basic measures are the entry and exit rates into and out of self-employment as used in, e.g., Evans and Leighton (1989), Fairlie (1999), Lin et al. (2000) and OECD (2000). Other studies use business-level statistics to compute firm entry and exit rates, see, e.g., Acs and Audretsch (1989), Austin and Rosenbaum (1990), Baldwin and Gorecki (1991), Brandt (2004), Caves (1998), Dunne et al. (1988), Eurostat (2004), Geroski (1995), OECD (1998), OECD (2005b) and Reynolds et al. (1994). Given that Schumpeter actually saw the formation of a new business as the most typical case of a new combination (van Praag,

⁷ EIM Business & Policy Research has corrected the OECD labor force database to facilitate cross-country comparison of business ownership rates, see van Stel (2005).

Table 3.3 Firm entry and exit rates, 2002.

Country	Entry	Exit	Turnover
Belgium	6.4	6.3	12.7
Denmark	9.2	9.8	19.0
Germany	8.9	7.0	15.9
Finland	8.0	7.6	15.6
France	6.7	4.1	10.8
Ireland	11.9	7.4	19.3
Italy	7.7	5.8	13.5
Japan	4.3	4.6	8.9
Netherlands	8.1	6.1	14.2
UK	12.6	10.4	23.0
USA	9.5	8.9	18.4

Note: Only firms with 50–1000 employees are included in the sample.

Source: <http://www.entrepreneurship-sme.eu>.

1999), the entry rate seems to be a natural indicator of Schumpeterian entrepreneurship.

Table 3.3 presents the firm entry rate which is computed as the number of new firms divided by the total number of companies in a given country.⁸ Compared to the business ownership rate, the ranking of countries changes substantially when using this simple flow-based indicator of entrepreneurship. For instance, while the Anglo-Saxon countries are much more entrepreneurial than Italy in terms of the firm entry rate, the picture is reversed if we look at the business ownership rates in Table 3.1. Another interesting observation is that although Germany and Japan have comparable business ownership rates, the German firm entry rate is two times larger than the Japanese.

If the firm entry rate is a measure of “carrying out” new combinations, then the firm exit rate may be an indicator of the opposite, namely the firms which are made obsolete by other Schumpeterian entrepreneurs. Hence, while the firm exit rate is not a direct measure of innovative entrepreneurship, it may be an indirect indicator of this since it captures the outcome of Schumpeterian entrepreneurship. Another common firm-level indicator is the turnover rate which sums the firm entry and exit rates, see, e.g., Eurostat (2004) and OECD (1998). These indicators may be interpreted as a measure of Schumpeter’s famous

⁸An alternative indicator has been used by, e.g., OECD (2005b) who computes the entry rate as the number of new firms divided by total employment.

process of “creative destruction” in which new products or production methods replace existing practices. As seen in Table 3.3, Denmark and the Anglo-Saxon countries are the most entrepreneurial countries according to the firm turnover indicator.

Firm-level statistics have several advantages compared to survey data. For instance, most datasets on firms are drawn from administrative records which minimize the problem of measurement errors and, in addition, insure a close correspondence between the data sample and the firm population. However, some entries in administrative firm records represent firms which change their legal status, owners or economic activity but remain unchanged in all other aspects.⁹ It is not at all obvious whether these changes should be considered as “innovative” organizational changes and, thus, be included in a measure of Schumpeterian entrepreneurship.

Furthermore, when using firm-level statistics, the unit of account is, of course, the firm. But, adding up the number of companies does not necessarily provide the total number of entrepreneurs as several individuals may be involved in the start-up of a single firm. It is therefore also relevant to analyze individual-level measures where the unit of account is more closely in agreement with most of the economic theories of entrepreneurship.

However, while the number of firms is an obvious denominator to use when computing firm entry and exit rates, it is not clear what divisor should be used, when computing transition measures using individual-level data. Should entry be measured relative to the cumulated stock of entrants (the self-employed), the set of potential entrants (the wage employed) or the sum of these (total employment or the labor force)? Table 3.4 therefore presents individual-level transition measures where both the number of self-employed and the labor force are used as denominators. In addition, we exploit the individual-level information in the ECHP to compute the high-skilled entry and exit rates which may give us an indicator that would to a larger degree reflect

⁹ Additionally, the definition and/or identification of new firms may differ across countries and, thus, complicate cross-country comparisons of firm turnover. The figures in Table 3.3 are comparable across countries.

Table 3.4 Self-employed entry and exit rates, 2001.

	Overall		High-skilled	
	Entry	Exit	Entry	Exit
<i>Panel A: % of of the self-employed</i>				
Austria	0.096	0.079	0.014	0.006
Belgium	0.064	0.094	0.032	0.043
Denmark	0.123	0.186	0.084	0.070
Finland	0.132	0.114	0.049	0.031
France	0.040	0.074	0.012	0.023
Germany	0.185	0.122	0.078	0.047
Greece	0.085	0.110	0.014	0.025
Ireland	0.122	0.153	0.055	0.024
Italy	0.114	0.093	0.021	0.017
Luxembourg	0.133	0.036	0.055	0.018
Netherlands	0.269	0.208	—	—
Portugal	0.110	0.088	0.016	0.004
Spain	0.141	0.220	0.051	0.038
UK	0.197	0.178	0.097	0.110
<i>Panel B: % of the labor force</i>				
Austria	0.007	0.006	0.000	0.000
Belgium	0.007	0.010	0.003	0.005
Denmark	0.007	0.010	0.005	0.004
Finland	0.013	0.011	0.005	0.003
France	0.003	0.005	0.001	0.002
Germany	0.015	0.010	0.006	0.004
Greece	0.022	0.028	0.002	0.006
Ireland	0.011	0.014	0.005	0.002
Italy	0.023	0.019	0.004	0.003
Luxembourg	0.007	0.002	0.003	0.001
Netherlands	0.014	0.011	—	—
Portugal	0.018	0.014	0.003	0.001
Spain	0.021	0.033	0.006	0.006
UK	0.023	0.021	0.007	0.013

Note: The agricultural sector has been dropped.

Source: ECHP.

the amount of innovative entrepreneurship in the economy, cf. the discussion in Section 3.2.

Denmark, Germany, the Netherlands and the United Kingdom have the highest self-employed turnover rates according to panel A of Table 3.4. This observation parallels the ranking based on firm turnover, although the Netherlands are much more entrepreneurial in terms of the self-employment transition indicators. Moreover, the Mediterranean countries — which were some of the most entrepreneurial countries when it came to the non-agricultural

self-employment rates — have only a limited amount of entrepreneurship according to the overall entry and exit rates (with Spain as an exception). The Mediterranean countries drop even further if we use high-skilled entry and exit rates as indicators of entrepreneurship. Interestingly, while Denmark was one of the least entrepreneurial countries when using the self-employment rate, it becomes one of the most entrepreneurial countries when using the high-skilled entry and exit rates.

The approach used for calculating transitions rates in panel A of Table 3.4 tend to downgrade countries with a large self-employment rate as can be seen by comparing, e.g., the relative positions of the Mediterranean countries across the panels of Table 3.4. This observation can be explained by the fact that the numbers in panel B are basically the products of the numbers in panel A and the self-employment rates.¹⁰ This shows that the choice of denominator is important when measuring entrepreneurship across countries. While this issue is ignored in most studies, Reynolds et al. (1994) compute the ratio of new firms to both the stock of firms and the population and their results confirm that the choice of denominator is by no means innocuous.

In summary, while Schumpeter considered entrepreneurs to be innovators, Kirzner saw opportunity-seeking as the defining characteristic of the entrepreneurs. As such, both Schumpeterian and Kirznerian entrepreneurship have to do with “changes.” Interestingly, the use of simple flow indicators as measures of entrepreneurship provides a different picture of entrepreneurial activity across countries than the stock measures of Sections 3.1 and 3.2. In addition, this ranking of countries depends crucially on how these flow measures are computed. Since theory provides little guidance on this issue, it is difficult to give specific recommendations for how to proceed with empirical work, apart from being explicit about the approach chosen.

¹⁰ Specifically, the flow measures presented in panel B of Table 3.4 could be calculated by multiplying the flow measures in panel A with the self-employment rates in the previous period (measured in percent of the labor force), thereby changing the denominator from the stock of self-employed to the labor force.

3.5 GEM and the Total Entrepreneurial Activity Index

The most prominent drawback of the measures we have presented so far is that national statistics are not completely harmonized across countries despite the recent efforts by Eurostat and OECD (Quill et al., 2006; Reynolds et al., 2005). Hence, cross-country analysis of entrepreneurial activity levels is not a straightforward task. One potential, yet expensive, solution to this problem is to carry out a comprehensive international survey of entrepreneurship in which data are collected in a consistent manner across countries. In fact, this has been the primary objective of the Global Entrepreneurship Monitor (GEM) since 1999. An additional benefit of such a research project is that the survey can be designed in a way which sheds light on several dimensions of entrepreneurship.

The entrepreneurs are, in the framework of GEM, individuals involved in the process of setting up a business, or individuals who own and manage a young firm (Reynolds et al., 2005). The former group of persons is referred to as *nascent entrepreneurs* and consists of individuals starting a personally-owned firm *and* those setting up a firm for their current employer which they expect to have some ownership of. The *owner-managers of young firms* are individuals who own and manage a business that is less than 42 months old. According to Reynolds et al. (2005), this cut-off value provides stable prevalence rates of owner-managers in a sample of 2000 individuals which is the minimum number of persons interviewed in each country.

Perhaps the best known GEM indicator is the Total Entrepreneurial Activity (TEA) index which is determined as the share of the adult population engaged in starting an enterprise or being an owner/manager of a business that is less than 42 months old. This measure has been used by, e.g., Autio et al. (2005), GEM (2004), OECD (2001a) and OECD (2001c).

As seen in Table 3.5, Argentina, Chile, India, Korea, and Thailand have the highest TEA rates and countries from Asia and South America tend to have the highest levels of entrepreneurial activity among the countries in the sample. While the Anglo-Saxon countries have a

Table 3.5 Measures of entrepreneurial activity.

	Nascent entrepreneurial activity index (2002)	Young firm entrepreneurial activity index (2002)	Total entrepreneurial activity index (2002)	Ratio of Nascent entrepreneurs to young firms (2002)
Argentina	8.52	6.20	14.15	1.37
Australia	3.76	5.22	8.68	0.72
Austria	3.02 ^b	2.37 ^b	5.28 ^b	1.27
Belgium	2.13	1.08	2.99	1.97
Brazil	5.69	8.46	13.53	0.67
Canada	5.94	3.58	8.82	1.66
Chile	10.40	5.49	15.68	1.89
China	5.54	7.41	12.34	0.75
Croatia	2.81	0.94	3.62	2.99
Denmark	3.63	3.12	6.53	1.16
Finland	2.68	2.06	4.56	1.30
France	2.40	0.86	3.20	2.79
Germany	3.51	2.07	5.16	1.70
Greece	3.70 ^a	2.20 ^a	5.80 ^a	1.68
Hong Kong	2.04	1.40	3.44	1.46
Hungary	3.49	3.62	6.64	0.96
Iceland	5.65	6.23	11.32	0.91
India	10.89	7.45	17.88	1.46
Ireland	5.66	4.20	9.14	1.35
Israel	3.36	3.88	7.06	0.87
Italy	3.74	2.35	5.90	1.59
Japan	0.87	1.04	1.81	0.84
Korea	5.85	9.29	14.52	0.63
Mexico	9.18	3.22	12.40	2.85
New Zealand	9.13	6.06	14.01	1.51
Norway	5.23	4.40	8.69	1.19
Poland	3.67	0.77	4.44	4.77
Portugal	2.20 ^a	1.80 ^a	4.00 ^a	1.22
Russia	1.09	1.54	2.52	0.71
Singapore	4.03	2.03	5.91	1.99
Slovenia	3.28	1.53	4.63	2.14
South Africa	4.71	2.00	6.54	2.36
Spain	2.24	2.54	4.59	0.88
Sweden	1.80	2.51	4.00	0.72
Switzerland	4.44	3.26	7.13	1.36
Thailand	11.63	8.40	18.90	1.38
The Netherlands	2.57	2.09	4.62	1.23
UK	2.49	3.05	5.37	0.82
USA	7.09	4.57	10.51	1.55

Notes: ^a2004 and ^b2005

Source: <http://www.entrepreneurship-sme.eu>.

TEA rate above the median (except the United Kingdom), the Eastern and Central European countries are all situated below the median. Interestingly, the Mediterranean countries have relative low TEA rates which parallel the conclusion from the simple entry/exit rates in the previous sections. No clear picture emerges with respect to the Nordic countries.

Since the TEA index focuses on start-up activity *and* new businesses surviving the start-up phase, it seems to combine both the Knightian stock measures and the flow measures indicating the level of innovative entrepreneurship. As such, it reflects both Knight's uncertainty-bearer and Schumpeter, Kirzner and Schultz's innovative and/or equilibrating entrepreneurs. The fact that the TEA index aggregates several different dimensions of entrepreneurship makes it difficult to interpret, cf. the discussion at the beginning of Chapter 3. For instance, we can easily imagine two countries which have similar TEA indices but very different amounts of start-up activity.

Alternatively, we may divide the TEA index into the *Nascent Entrepreneurial Activity* (NEA) Index and the *Young Firm Entrepreneurial Activity* (YFEA) Index, cf. Reynolds et al. (2005).¹¹ This may provide us with a more nuanced picture of entrepreneurship as the NEA index may better capture Schumpeterian entrepreneurship, i.e., the individuals who attempt to implement new firms, while the YFEA index has more of a Knightian flavor to it. Nascent entrepreneurship has been studied intensively in recent years which is partly due to the availability of new datasets, see, e.g., Arenius and Minitti (2005), Parker and Belghitar (2006), Reynolds et al. (2004), and Wennekers et al. (2005).

We see in Table 3.5 that the young firms are outnumbered by the nascent entrepreneurs in most countries. However, one interesting observation is that while Australia and Canada have similar TEA indices, the NEA index is almost twice as high in Canada.

¹¹ These two indicators should, in principle, add up to the TEA index. However, this is not the case in Table 3.5 which may be attributed to the use of sampling weights when estimating each measure of entrepreneurial activity.

3.6 Other Measures

The indicators we have presented so far have tried to measure the number of entrepreneurs directly. In this section, we review some additional measures of entrepreneurship which have taken a more indirect approach such as, e.g., measuring the *consequences* or *outcomes* of entrepreneurship.

3.6.1 Measures of Innovation

The entrepreneur is in the theories of Schumpeter an innovator who drives the process of “creative destruction” and economic growth. Schumpeterian entrepreneurship will, in other words, manifest itself in innovations. An alternative indicator of entrepreneurship may therefore be based on the number of innovations instead of the number of innovators. Several different indicators of innovative activity have been suggested in the literature. They include R&D expenditures, the number of patents or other measures of innovative output, see Audretsch (1995) and Audretsch (2002).

Although these indicators may measure the number of inventions, they need not capture the number of Schumpeterian entrepreneurs who are the leaders “carrying out” new combinations. Similarly, Kirznerian and Schultzian entrepreneurs are not necessarily inventors but instead agents that react to new economic opportunities initiated by, e.g., a new innovation. Furthermore, R&D expenditures and the number of patents may also be criticized for not measuring successful innovations but instead input cost and/or strategic interaction among firms (Griliches, 1990).

The *innovativeness* of a given area is proxied by the number of patents relative to the population in Acs et al. (2007), whereas Salgado-Bando (2005) uses the number of patent applications filed by residents relative to the labor force.¹² The numbers from Salgado-Bando (2005) are presented in Table 3.6. Japan is the most entrepreneurial country

¹²One may, alternatively, use *triad* patents, which is an invention that is patented in the EU, Japan, and the United States. Given the cost of obtaining a triad patent, these are expected to be the economically valuable patents and, thus, measure the most successful innovations.

Table 3.6 Entrepreneurial intentions and innovations.

	Latent entrepreneurship	Innovative entrepreneurship
Australia	—	1.45
Austria	—	1.09
Belgium	—	0.39
Bulgaria	55.4	—
Canada	57.5	0.29
Czech Republic	36.8	—
Denmark	29.7	0.77
East Germany	56.6	—
Finland	—	1.19
France	41.8	0.86
Greece	—	0.31
Hungary	49.8	—
Iceland	—	0.28
Ireland	—	0.82
Israel	49.7	—
Italy	63.3	0.25
Japan	40.9	7.03
Korea	—	0.99
Mexico	—	—
Netherlands	36.0	0.75
New Zealand	64.2	1.04
Norway	26.9	0.70
Poland	79.9	—
Portugal	73.3	0.03
Russia	33.2	—
Slovenia	57.8	—
Spain	38.9	0.21
Sweden	38.8	1.60
Switzerland	64.5	1.94
UK	45.1	1.25
USA	70.8	1.00
West Germany	64.0	—

Sources: Blanchflower et al. (2001) and Salgado-Bando (2005).

according to this indicator and its innovative activity level is seven times higher than the American. The Mediterranean countries are the least innovative in the sample.

3.6.2 Measures of Entrepreneurial Intentions

The entrepreneur is constantly seeking opportunities according to Kirzner and a relevant indicator of entrepreneurship may therefore be based on “entrepreneurial spirit,” or attitudes toward entrepreneurship in a given country. Trying to quantify such vague concepts is not

an easy task but it has been done in social surveys, see, e.g., Blanchflower et al. (2001) and Grilo and Irigoyen (2006). In Blanchflower et al. (2001), the number of potential entrepreneurs is defined as the number of individuals who prefer to be self-employed if they had to choose between wage-employment and self-employment. The measure of entrepreneurial spirit is then calculated as the number of potential entrepreneurs divided by the labor force.

As seen in Table 3.6, Italy and Portugal are some of the countries which are most positive toward self-employment and this seems to translate into high self-employment rates, cf. Table 3.1. This is not the case for the United States which has one of the lowest self-employment rates in Table 3.1, despite one of the highest entrepreneurial spirits.

3.6.3 Performance Measures

Researchers and politicians are, in general, interested in successful entrepreneurs where success is measured by growth or survival. One should, however, be careful when trying to measure the amount of entrepreneurship by an outcome (such as growth) which could be the result of numerous other factors. In addition, while firm growth and survival may be a consequence of Knightian, Kirznerian and Schumpeterian entrepreneurship, growth does not imply that the firms are entrepreneurial, cf. the example of the PC invention in Section 2.6.

Alternative measures such as the ratio of “gazelles,” defined as new growth businesses to the total number of businesses in the economy, have also been used to characterize entrepreneurship; see, e.g., Birch (1979), Kirchoff (1994), and Storey (1997). The presumption is that gazelles are more entrepreneurial than other businesses making the ratio of gazelles to “regular” businesses an indicator of entrepreneurship.

Another common indicator is the survival rate of firms which is calculated as the proportion of firms that are still active after a specified time period. This measure has been used in, e.g., Bartelsman et al. (2003), OECD (1997), and OECD (1998). While the survival rate is related to entry/exit rates and Schumpeter’s process of “creative

destruction,” it is not at all obvious whether a high or low survival rate is preferred since both outcomes can be desirable.

Finally, Audretsch and Thurik (2001), Bartelsman et al. (2003), OECD (1997), and Parker (2004) use the relative share of economic activity (GDP or employment) accounted for by small firms as an indicator of entrepreneurship.

In sum, while the outcome and performance-based measures are capturing important consequences of entrepreneurship and entrepreneurial activity, their relationships with the theoretical definitions of the entrepreneur are more diffuse.

4

Comparison and Discussion

As noted in the previous section, no general measure of entrepreneurship contained in a single number can be constructed. As such, researchers need to consider specialized measures which focus on specific dimensions of entrepreneurship. According to our theoretical discussion, these aspects include uncertainty-bearing, management, decision-making, opportunity-seeking, and innovative activity. Obviously, entrepreneurship is difficult to measure and operationalize for empirical work.

In Chapter 3, we have reviewed some of the most commonly used indicators of entrepreneurship. These can roughly be divided into three categories: (1) stock measures (self-employment rates), (2) flow measures (firm and self-employment entry/exit rates); and (3) indirect indicators of entrepreneurship such as, e.g., patents or growth measures.

We have argued that because the stock measures focus on business owners, they are most closely related to Knight's entrepreneur who acts as a residual claimant. Despite the fact that modifications of the self-employment rate may provide indications of innovative entrepreneurship, the flow measures seem more appropriate for capturing the process of change embedded in the theories of Schumpeter and Kirzner. Ideally,

an indicator of Schumpeterian entrepreneurship should measure all five of his entrepreneurial tasks, but we are forced to settle for less because of lack of data. Self-employment and firm entry and exit rates are used frequently in the literature and with the current data available this is probably as far as we can go.

To illustrate that the distinction between the different empirical measures matters empirically, we have tried to compare entrepreneurial activity across the OECD countries using the different measures. Table 4.1 sums up this information by comparing the cross-country rankings according to the different measures. Although, the rankings are based on estimates and hide important information, Table 4.1 still leads to a number of interesting observations. The overall impression is that the variations in rankings of countries are substantial and cannot be ascribed exclusively to sampling variation.

While Greece is consistently one of the most entrepreneurial countries according to the self-employment rates, it has a low degree of entrepreneurship according to the self-employed transition measures in columns 8 and 9. The reverse applies to, e.g., Germany and the United Kingdom. However, an important observation is that Greece and the United Kingdom have comparable levels of entrepreneurial activity when the self-employed transition measures are computed using the labor force as the denominator.

The stock-based measures in columns 1–5 also show much *within* variation with respect to the ranking. Examples include Belgium, Portugal, Germany, and Sweden. Most of this within variation can be attributed to differences between the high-skilled self-employment rates (columns 4 and 5) and the overall self-employment rates in columns 1–3. Similarly, the flow-based measures of entrepreneurship also exhibit some within variation.

The TEA indices in columns 12–14 suggest yet another ranking of the OECD countries. For instance, while the United Kingdom is more entrepreneurial than the United States according to the self-employment rates, this ranking is reversed when using the GEM measures.

To illustrate the empirical relationships between the different measures, Table 4.2 presents a correlation matrix of the different

Table 4.1 Ranking of countries according to different measures.

	Self-employment rate (2002)	Non-agricultural self-employment rate (2002)	Non-agricultural business ownership rate (2002)	High-skilled self-employment rates	Self-employment rates in high-skilled sectors	Firm entry rate (%)	Firm exit rate (%)	Self-employed exit rate (% of SE)	Self-employed entry rate (% of LF)	Self-employed exit rate (% of LF)	Nascent entrepreneurial activity index (2002)	Young Firm entrepreneurial activity index (2002)	Total entrepreneurial activity index (2002)	Latent entrepreneurial activity index (2002)	Innovative entrepreneurial activity index (2002)
Australia	14	13	5	—	—	—	—	—	—	—	10	4	9	—	4
Austria	20	24	16	14	9	—	—	11	12	12	17	6	16	—	7
Belgium	13	10	9	1	11	10	7	13	9	10	24	23	25	—	16
Canada	23	21	8	—	—	—	—	—	—	—	4	9	7	8	18
Czech Republic	12	9	—	—	—	—	—	—	—	—	—	—	—	15	—
Denmark	27	25	21	12	13	4	2	7	3	13	14	12	12	17	13
Finland	16	19	15	8	8	7	4	6	7	8	18	21	20	—	6
France	25	26	14	11	14	9	11	14	13	14	21	25	24	11	11
Germany	21	18	18	5	7	5	6	3	6	6	15	20	17	6	—
Greece	2	1	1	3	2	—	—	12	8	3	2	12	14	—	17
Hungary	15	15	—	—	—	—	—	—	—	—	16	8	11	9	—
Iceland	11	11	7	—	—	—	—	—	—	—	7	2	4	—	19
Ireland	10	10	10	10	10	2	5	8	3	9	6	7	6	—	12
Italy	6	5	2	7	1	8	9	9	10	1	11	17	13	7	20
Japan	18	20	19	—	—	11	10	—	—	—	26	24	26	12	1
Korea	4	3	—	—	—	—	—	—	—	—	5	1	1	—	10
Luxembourg	30	28	23	9	12	—	—	5	14	10	—	—	—	—	—
Mexico	3	1	—	—	—	—	—	—	—	—	1	11	3	—	—
Netherlands	19	17	11	—	—	6	8	1	2	7	19	19	18	16	14
New Zealand	8	7	3	—	—	—	—	—	—	—	2	3	2	5	8
Norway	29	29	22	—	—	—	—	—	—	—	8	6	8	18	15
Poland	7	13	—	—	—	—	—	—	—	—	13	26	21	1	—
Portugal	5	6	4	13	4	—	—	10	11	5	23	22	22	2	22
Slovak Republic	26	22	—	—	—	—	—	—	—	—	—	—	—	—	—
Spain	9	8	6	4	3	—	—	4	1	4	1	22	19	13	21
Sweden	24	23	12	6	5	—	—	2	4	2	3	25	22	14	3
Switzerland	22	20	20	—	—	—	—	—	—	—	9	10	10	4	2
Turkey	1	4	—	—	—	—	—	—	—	—	—	—	—	—	—
UK	17	16	13	2	6	1	1	2	4	2	3	20	15	10	5
USA	28	27	17	—	—	3	3	—	—	—	3	5	5	3	9

Note: SE: Self-Employed, LF: Labor Force.

Table 4.2 Correlations between different measures.

	SE	LF										
SE	0.50		0.53		0.56		0.58		0.60		0.62	
LF	0.56	0.48	0.54	0.45	0.57	0.47	0.59	0.48	0.61	0.50	0.63	0.51
SE			0.53		0.56		0.58		0.60		0.62	
LF			0.48	0.45	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54
SE					0.56		0.58		0.60		0.62	
LF					0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54
SE							0.58		0.60		0.62	
LF							0.49	0.50	0.51	0.52	0.53	0.54
SE									0.60		0.62	
LF									0.51	0.52	0.53	0.54
SE											0.62	
LF											0.53	0.54
SE												
LF												

Note: SE: Self-Employed, LF: Labor Force.

measures.¹ The first thing to note is that the correlations within the stock-based (columns 1–5) and flow-based measures (columns 6–11) are all positive and generally strong. However, the correlations between the stock- and flow-based measures taken from the literature are in many cases negative.

This negative correlation may be due to the fact some of the flow measures consider new self-employed relative to the stock of self-employed. That is, the stock of self-employed enters the denominator when calculating the flow measures. This will, as already noted, tend to downgrade countries with a large self-employment rate and thereby induce a negative correlation between these measures. To illustrate this point, we see in Table 4.2 that the correlations between the alternative flow measures, which use the labor force in the denominator (columns 10 and 11), and the stock measures are positive and somewhat high.

This again illustrates why precision is important. The entry and exit rates in columns 8 and 9 indicate the degree of innovative activity within the self-employment sector. The alternative flow measures using the labor force as denominator reflect the degree of activity relative to the potential of the economy and are, in this respect, perhaps a better indicator of the level of, e.g., Schumpeterian entrepreneurship in the economy.

While we have argued that the TEA index combines both the Knigh-tian stock measures and the flow measures, Table 4.2 shows that the empirical correlation between the TEA index and the firm entry/exit rates is the strongest. Not surprisingly, both the NEA and YFEA indices are also strongly correlated with the firm entry/exit rate. No clear picture emerges with respect to the measures of latent and innovative entrepreneurship.

In sum, the correlation matrix in Table 4.2 underscores the importance of distinguishing between the different empirical measures. This in turn requires researchers to be precise about what dimension of entrepreneurship is analyzed in a given context as the choice of indicator will implicitly specify their view of entrepreneurship.

¹To check the robustness of our results we recalculated the correlation matrix using the rankings of countries instead of the measures. These calculations showed a similar picture.

5

Conclusion

“Entrepreneurship” is frequently advocated in the public debate as the solution to all (or at least *most* of) our trouble. However, often we do not know precisely what is meant with it, nor is it clear, what the different empirical measures of entrepreneurship are capturing. In this paper, we have tried to compare the theoretical ideas with what people are actually measuring.

First, we found that the different theoretical definitions of entrepreneurship reflect a diverse set of ideas about the role of entrepreneurship in the economy, involving aspects such as innovation, uncertainty-bearing, opportunity-seeking, and management. While the different perceptions of entrepreneurship may all be important for the economy — we should expect them to have rather different consequences. Thus, while both the uncertainty-bearer and the innovator are needed for the functioning of the economy, they perform different roles. This also implies that the appropriate set of policy instruments depend on which aspect of entrepreneurship that should be promoted.

Second, these different aspects are to varying degrees reflected in the various empirical measures. While some of these are good indicators of what we have termed “Knightian entrepreneurship,” others

may better capture (some) aspects of Schumpeterian or Kirznerian entrepreneurship. In general, stock measures seem better suited at measuring Knight's ideas, while flow measures to a large extent capture those of Schumpeter and Kirzner.

This distinction needs only be of academic interest if all empirical measures show the same picture. Thus, if the measures reflecting Knightian entrepreneurship are highly correlated with Schumpeterian indicators, measuring one or the other would not matter much. And it could be conjectured that policies promoting one would also promote the other.

However, we found considerable differences when comparing the levels of entrepreneurship across countries using the different measures. Thus, the different empirical measures not only reflect different theoretical aspects, they also provide very different pictures of the entrepreneurial activity level across countries. Hence, we cannot in general identify countries which are less entrepreneurial. Instead, some countries are entrepreneurial in a Knightian sense while less so in a Schumpeterian sense.

Many policies aimed at increasing entrepreneurial activities, rely on measures of entrepreneurial activity to document weak spots — or less entrepreneurial areas. Given that the empirical measures reflect rather different aspects of entrepreneurship — policy-makers should always be aware of the appropriateness of the empirical measure used as a measure of their perception of entrepreneurship in the given situation. The growth prospects and ability to create new jobs from Schumpeterian entrepreneurship is most likely to differ from that of Knightian entrepreneurship.

Furthermore, the substantial differences across measures highlight the problems involved in constructing composite indicators based on two or more of the specialized measures. Such composite indicators are likely to be very sensitive to the weights attached to the included indicators.

More research is definitely needed in this area to provide both better measures of the different aspects of entrepreneurship and to further clarify the relationships between the different measures and our understanding of entrepreneurship.

Appendix

Part of the preceding analysis is based on survey data from the European Community Household Panel (ECHP) — a comprehensive European panel study that at present contains eight waves covering the period 1994–2001. The data is provided by Eurostat and based on interviews with households. The questions in the survey cover: demographics, (un)employment issues, income, training, education and social benefits.

There are two desirable features of the data: (1) it is possible to undertake a direct comparison across countries, as the same questionnaire is used in all countries, and (2) we are able to track individuals over time, as the data has a true panel structure. Hence, it is possible to identify transitions between different labor market states and compare these across countries.

In our analyzes, we exclude economically inactive individuals, such as students, retired persons, and individuals doing housework, community work or military service, as well as unpaid family workers. We focus on individuals aged 25–60 to minimize national effects of education and early retirement schemes. As in most empirical work, we exclude the

agricultural sector because employment in this sector may be distorted by subsidies.

A.1 Self-Employment Rates

The raw self-employment rate is calculated as the share of self-employed relative to the labor force.

The high-skilled self-employment rate is calculated as the share of self-employed with higher education relative to the labor force. High-skilled individuals are defined as those with tertiary education corresponding to ISCED 5–7. The labor force is in this case restricted to contain only individuals with an observed educational category. Furthermore, we exclude the Netherlands due to errors in the reported education levels.

When calculating sector specific self-employment rates, we restrict the labor force to self-employed and wage workers only, as unemployed individuals are not affiliated with a sector. Individuals with no sector information or working in public sectors like public administration, education, health, and social work are dropped. High-skilled sectors are identified as the most skill-intensive sectors across EU-15, where each sector's skill intensity is normalized by the national skill level in order to control for different educational levels across countries.

A.2 Flow Measures

The entry (exit) rate is calculated as the ratio of individuals entering (exiting) self-employment relative to *either* the stock of self-employment in the previous period, or the entire population. The agricultural sector and individuals with no information regarding last period's employment status are dropped. Sweden is excluded because of unreliable estimates caused by a large attrition in the database and the lack of retrospective variables. The high-skilled entry (exit) rate is defined as individuals with a tertiary education making a transition into (out of) self-employment relative to either the stock of self-employed in the previous period or the entire population.

Tables A.1, A.2, A.3, A.4, A.5 and A.6 contain detailed estimates of self-employment rates and entry/exit rates for the years 1994–2001 to supplement the numbers presented in the main text. Additional tables are available upon request from the authors.

Table A.1 Non-agricultural self-employment share of labor force (ECHP).

	1994	1995	1996	1997	1998	1999	2000	2001
Austria	—	0.078 <i>0.006</i>	0.082 <i>0.007</i>	0.071 <i>0.007</i>	0.068 <i>0.007</i>	0.074 <i>0.007</i>	0.072 <i>0.007</i>	0.075 <i>0.008</i>
Belgium	0.111 <i>0.006</i>	0.118 <i>0.006</i>	0.111 <i>0.006</i>	0.115 <i>0.007</i>	0.110 <i>0.007</i>	0.118 <i>0.008</i>	0.116 <i>0.008</i>	0.104 <i>0.008</i>
Denmark	0.053 <i>0.004</i>	0.056 <i>0.005</i>	0.052 <i>0.005</i>	0.054 <i>0.005</i>	0.056 <i>0.006</i>	0.049 <i>0.006</i>	0.058 <i>0.006</i>	0.051 <i>0.006</i>
Finland	—	—	0.087 <i>0.005</i>	0.089 <i>0.005</i>	0.112 <i>0.005</i>	0.111 <i>0.006</i>	0.098 <i>0.007</i>	0.104 <i>0.008</i>
France	0.069 <i>0.003</i>	0.078 <i>0.003</i>	0.078 <i>0.004</i>	0.074 <i>0.004</i>	0.070 <i>0.004</i>	0.069 <i>0.004</i>	0.070 <i>0.004</i>	0.066 <i>0.004</i>
Germany*	0.064 <i>0.004</i>	0.064 <i>0.004</i>	0.067 <i>0.004</i>	—	—	—	—	—
Germany**	0.074 <i>0.005</i>	0.082 <i>0.006</i>	0.090 <i>0.006</i>	0.090 <i>0.006</i>	0.084 <i>0.006</i>	0.089 <i>0.007</i>	0.078 <i>0.006</i>	0.084 <i>0.007</i>
Greece	0.287 <i>0.008</i>	0.276 <i>0.008</i>	0.270 <i>0.008</i>	0.264 <i>0.008</i>	0.275 <i>0.009</i>	0.262 <i>0.009</i>	0.258 <i>0.009</i>	0.248 <i>0.009</i>
Ireland	0.114 <i>0.006</i>	0.113 <i>0.006</i>	0.114 <i>0.007</i>	0.111 <i>0.007</i>	0.106 <i>0.007</i>	0.107 <i>0.009</i>	0.099 <i>0.009</i>	0.090 <i>0.009</i>
Italy	0.203 <i>0.006</i>	0.219 <i>0.006</i>	0.218 <i>0.006</i>	0.212 <i>0.006</i>	0.208 <i>0.006</i>	0.209 <i>0.006</i>	0.209 <i>0.007</i>	0.209 <i>0.007</i>
Luxembourg*	0.072 <i>0.009</i>	0.073 <i>0.009</i>	0.068 <i>0.009</i>	—	—	—	—	—
Luxembourg**	—	0.085 <i>0.006</i>	0.073 <i>0.006</i>	0.071 <i>0.006</i>	0.067 <i>0.006</i>	0.063 <i>0.006</i>	0.063 <i>0.006</i>	0.061 <i>0.006</i>
Netherlands	0.042 <i>0.003</i>	0.044 <i>0.003</i>	0.049 <i>0.004</i>	0.050 <i>0.004</i>	0.048 <i>0.004</i>	0.053 <i>0.004</i>	0.052 <i>0.004</i>	0.055 <i>0.004</i>
Portugal	0.177 <i>0.008</i>	0.179 <i>0.008</i>	0.184 <i>0.008</i>	0.180 <i>0.009</i>	0.176 <i>0.009</i>	0.167 <i>0.009</i>	0.164 <i>0.009</i>	0.168 <i>0.010</i>
Spain	0.163 <i>0.005</i>	0.160 <i>0.005</i>	0.159 <i>0.006</i>	0.158 <i>0.006</i>	0.160 <i>0.007</i>	0.157 <i>0.007</i>	0.162 <i>0.008</i>	0.138 <i>0.007</i>
Sweden	—	—	—	0.101 <i>0.006</i>	0.099 <i>0.006</i>	0.098 <i>0.006</i>	0.095 <i>0.006</i>	0.099 <i>0.006</i>
UK*	0.136 <i>0.005</i>	0.140 <i>0.006</i>	0.141 <i>0.007</i>	—	—	—	—	—
UK**	0.129 <i>0.006</i>	0.135 <i>0.006</i>	0.136 <i>0.006</i>	0.132 <i>0.006</i>	0.119 <i>0.006</i>	0.118 <i>0.006</i>	0.112 <i>0.006</i>	0.119 <i>0.006</i>

Note: See Table 3.1. Robust Standard Errors in *italics* (estimated using sampling weights).

*Original ECHP survey **ECHP based on national survey.

Table A.2 High-skilled self-employment rates.

	1994	1995	1996	1997	1998	1999	2000	2001
Austria	—	0.012 <i>0.002</i>	0.008 <i>0.002</i>	0.009 <i>0.002</i>	0.008 <i>0.002</i>	0.009 <i>0.002</i>	0.011 <i>0.003</i>	0.015 <i>0.003</i>
Belgium	0.047 <i>0.004</i>	0.051 <i>0.004</i>	0.047 <i>0.004</i>	0.051 <i>0.005</i>	0.056 <i>0.005</i>	0.060 <i>0.006</i>	0.062 <i>0.006</i>	0.058 <i>0.006</i>
Denmark	0.017 <i>0.002</i>	0.019 <i>0.003</i>	0.017 <i>0.003</i>	0.019 <i>0.003</i>	0.016 <i>0.003</i>	0.013 <i>0.002</i>	0.019 <i>0.003</i>	0.018 <i>0.003</i>
Finland	—	—	0.028 <i>0.003</i>	0.028 <i>0.003</i>	0.028 <i>0.003</i>	0.029 <i>0.003</i>	0.027 <i>0.003</i>	0.028 <i>0.004</i>
France	0.020 <i>0.002</i>	0.022 <i>0.002</i>	0.023 <i>0.002</i>	0.022 <i>0.002</i>	0.021 <i>0.002</i>	0.020 <i>0.002</i>	0.021 <i>0.002</i>	0.020 <i>0.002</i>
Germany*	0.028 <i>0.003</i>	0.028 <i>0.003</i>	0.030 <i>0.003</i>	—	—	—	—	—
Germany**	0.030 <i>0.003</i>	0.034 <i>0.004</i>	0.036 <i>0.003</i>	0.033 <i>0.003</i>	0.034 <i>0.003</i>	0.035 <i>0.003</i>	0.030 <i>0.003</i>	0.035 <i>0.004</i>
Greece	0.068 <i>0.004</i>	0.072 <i>0.005</i>	0.068 <i>0.005</i>	0.066 <i>0.005</i>	0.066 <i>0.006</i>	0.059 <i>0.005</i>	0.059 <i>0.005</i>	0.052 <i>0.005</i>
Ireland	0.025 <i>0.003</i>	0.026 <i>0.004</i>	0.028 <i>0.004</i>	0.026 <i>0.004</i>	0.027 <i>0.004</i>	0.029 <i>0.005</i>	0.020 <i>0.004</i>	0.021 <i>0.004</i>
Italy	0.021 <i>0.002</i>	0.021 <i>0.002</i>	0.023 <i>0.002</i>	0.022 <i>0.002</i>	0.026 <i>0.002</i>	0.026 <i>0.002</i>	0.028 <i>0.003</i>	0.029 <i>0.003</i>
Luxembourg*	0.036 <i>0.006</i>	0.037 <i>0.007</i>	0.029 <i>0.006</i>	—	—	—	—	—
Luxembourg**	—	0.027 <i>0.004</i>	0.017 <i>0.003</i>	0.020 <i>0.003</i>	0.022 <i>0.004</i>	0.021 <i>0.004</i>	0.021 <i>0.004</i>	0.025 <i>0.004</i>
Netherlands	0.013 <i>0.002</i>	0.014 <i>0.002</i>	0.017 <i>0.002</i>	0.016 <i>0.002</i>	0.001 <i>0.000</i>	0.005 <i>0.001</i>	0.003 <i>0.001</i>	0.000 <i>0.000</i>
Portugal	0.013 <i>0.003</i>	0.014 <i>0.003</i>	0.012 <i>0.003</i>	0.015 <i>0.003</i>	0.014 <i>0.003</i>	0.013 <i>0.003</i>	0.014 <i>0.003</i>	0.017 <i>0.004</i>
Spain	0.029 <i>0.002</i>	0.030 <i>0.003</i>	0.030 <i>0.003</i>	0.034 <i>0.003</i>	0.036 <i>0.004</i>	0.035 <i>0.003</i>	0.034 <i>0.004</i>	0.035 <i>0.004</i>
Sweden	—	—	—	0.028 <i>0.003</i>	0.026 <i>0.003</i>	0.036 <i>0.004</i>	0.033 <i>0.003</i>	0.035 <i>0.004</i>
UK*	0.036 <i>0.003</i>	0.039 <i>0.003</i>	0.044 <i>0.004</i>	—	—	—	—	—
UK**	0.049 <i>0.004</i>	0.053 <i>0.004</i>	0.053 <i>0.004</i>	0.054 <i>0.004</i>	0.070 <i>0.005</i>	0.070 <i>0.005</i>	0.055 <i>0.004</i>	0.057 <i>0.004</i>

Note: See Table 3.2. Robust Standard Errors in *italics* (estimated using sampling weights).

*Original ECHP survey **ECHP based on national survey.

Table A.3 Self-employment in low- and high-skilled sectors.

	1994		1995		1996		1997		1998		1999		2000		2001	
	Low	High														
Austria	—	—	0.100	0.055	0.100	0.066	0.085	0.079	0.086	0.079	0.097	0.081	0.081	0.086	0.091	0.094
			<i>0.010</i>	<i>0.010</i>	<i>0.010</i>	<i>0.013</i>	<i>0.010</i>	<i>0.015</i>	<i>0.011</i>	<i>0.015</i>	<i>0.012</i>	<i>0.015</i>	<i>0.011</i>	<i>0.018</i>	<i>0.012</i>	<i>0.019</i>
Belgium	0.177	0.133	0.181	0.143	0.173	0.131	0.191	0.100	0.190	0.104	0.131	0.093	0.105	0.018	0.175	0.075
	<i>0.013</i>	<i>0.014</i>	<i>0.014</i>	<i>0.015</i>	<i>0.015</i>	<i>0.015</i>	<i>0.016</i>	<i>0.016</i>	<i>0.017</i>	<i>0.015</i>	<i>0.036</i>	<i>0.039</i>	<i>0.036</i>	<i>0.013</i>	<i>0.019</i>	<i>0.014</i>
Denmark	0.104	0.047	0.105	0.059	0.092	0.041	0.090	0.038	0.100	0.059	0.095	0.059	0.094	0.045	0.077	0.046
	<i>0.010</i>	<i>0.009</i>	<i>0.010</i>	<i>0.012</i>	<i>0.011</i>	<i>0.011</i>	<i>0.012</i>	<i>0.011</i>	<i>0.015</i>	<i>0.015</i>	<i>0.017</i>	<i>0.018</i>	<i>0.016</i>	<i>0.012</i>	<i>0.016</i>	<i>0.011</i>
Finland	—	—	—	—	0.150	0.099	0.153	0.090	0.095	0.078	0.118	0.098	0.136	0.094	0.144	0.095
			<i>0.010</i>	<i>0.011</i>	<i>0.010</i>	<i>0.011</i>	<i>0.010</i>	<i>0.011</i>	<i>0.017</i>	<i>0.020</i>	<i>0.016</i>	<i>0.023</i>	<i>0.017</i>	<i>0.022</i>	<i>0.020</i>	<i>0.021</i>
France	0.109	0.043	0.109	0.044	0.104	0.047	0.115	0.054	0.112	0.045	0.107	0.051	0.105	0.048	0.100	0.043
	<i>0.007</i>	<i>0.006</i>	<i>0.007</i>	<i>0.006</i>	<i>0.007</i>	<i>0.006</i>	<i>0.008</i>	<i>0.007</i>	<i>0.008</i>	<i>0.007</i>	<i>0.008</i>	<i>0.007</i>	<i>0.008</i>	<i>0.007</i>	<i>0.009</i>	<i>0.007</i>
Germany*	0.078	0.075	0.075	0.069	0.080	0.069	—	—	—	—	—	—	—	—	—	—
	<i>0.007</i>	<i>0.009</i>	<i>0.007</i>	<i>0.009</i>	<i>0.007</i>	<i>0.009</i>	—	—	—	—	—	—	—	—	—	—
Germany**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Greece	0.452	0.291	0.431	0.279	0.418	0.258	0.420	0.257	0.411	0.261	0.409	0.202	0.394	0.216	0.375	0.193
	<i>0.012</i>	<i>0.021</i>	<i>0.013</i>	<i>0.022</i>	<i>0.013</i>	<i>0.023</i>	<i>0.014</i>	<i>0.023</i>	<i>0.014</i>	<i>0.026</i>	<i>0.015</i>	<i>0.022</i>	<i>0.015</i>	<i>0.022</i>	<i>0.014</i>	<i>0.021</i>
Ireland	0.187	0.149	0.182	0.140	0.184	0.147	0.181	0.133	0.171	0.121	0.170	0.134	0.148	0.104	0.138	0.094
	<i>0.011</i>	<i>0.017</i>	<i>0.012</i>	<i>0.018</i>	<i>0.014</i>	<i>0.020</i>	<i>0.014</i>	<i>0.020</i>	<i>0.014</i>	<i>0.019</i>	<i>0.017</i>	<i>0.020</i>	<i>0.018</i>	<i>0.021</i>	<i>0.017</i>	<i>0.019</i>

(Continued)

Table A.3 (Continued).

	1994		1995		1996		1997		1998		1999		2000		2001	
	Low	High														
Italy	0.341	0.226	0.362	0.254	0.347	0.242	0.349	0.236	0.347	0.231	0.339	0.238	0.338	0.232	0.334	0.263
Luxembourg*	0.077	0.077	0.075	0.075	0.084	0.053	—	—	—	—	—	—	—	—	—	—
Luxembourg**	0.014	0.020	0.014	0.019	0.017	0.014	—	—	—	—	—	—	—	—	—	—
Portugal	0.274	0.150	0.264	0.156	0.259	0.146	0.269	0.166	0.258	0.173	0.241	0.174	0.248	0.133	0.252	0.124
Spain	0.287	0.139	0.274	0.160	0.274	0.157	0.271	0.166	0.267	0.164	0.269	0.144	0.270	0.131	0.229	0.124
Sweden	—	—	—	—	—	—	0.164	0.158	0.177	0.130	0.160	0.137	0.139	0.136	0.156	0.120
UK*	0.218	0.111	0.214	0.108	0.220	0.116	0.012	0.016	0.012	0.015	0.012	0.014	0.011	0.015	0.012	0.013
UK**	0.010	0.010	0.011	0.011	0.014	0.014	0.190	0.124	0.185	0.117	0.180	0.117	0.164	0.115	0.181	0.118
	0.011	0.011	0.012	0.012	0.011	0.012	0.011	0.012	0.011	0.011	0.011	0.012	0.011	0.012	0.012	0.012

Note: See Table 3.2. Robust Standard Errors in *italics* (estimated using sampling weights).

*Original ECHP survey **ECHP based on national survey.

Table A.4 Self-employment rates in a standard sector classification.

	1994		1995		1996		1997		1998		1999		2000		2001	
	Industry	Service														
Austria	—	—	0.054	0.121	0.057	0.122	0.054	0.111	0.054	0.115	0.052	0.133	0.046	0.117	0.051	0.129
			<i>0.008</i>	<i>0.014</i>	<i>0.009</i>	<i>0.014</i>	<i>0.009</i>	<i>0.014</i>	<i>0.009</i>	<i>0.016</i>	<i>0.009</i>	<i>0.017</i>	<i>0.009</i>	<i>0.016</i>	<i>0.010</i>	<i>0.017</i>
Belgium	0.113	0.208	0.121	0.214	0.108	0.207	0.127	0.188	0.101	0.207	0.134	0.107	0.079	0.061	0.109	0.160
	<i>0.012</i>	<i>0.015</i>	<i>0.013</i>	<i>0.016</i>	<i>0.013</i>	<i>0.017</i>	<i>0.016</i>	<i>0.018</i>	<i>0.014</i>	<i>0.019</i>	<i>0.050</i>	<i>0.031</i>	<i>0.039</i>	<i>0.025</i>	<i>0.019</i>	<i>0.018</i>
Denmark	0.070	0.097	0.071	0.107	0.062	0.088	0.076	0.067	0.091	0.081	0.093	0.074	0.078	0.068	0.057	0.070
	<i>0.010</i>	<i>0.010</i>	<i>0.010</i>	<i>0.012</i>	<i>0.010</i>	<i>0.013</i>	<i>0.013</i>	<i>0.011</i>	<i>0.018</i>	<i>0.014</i>	<i>0.021</i>	<i>0.016</i>	<i>0.016</i>	<i>0.014</i>	<i>0.015</i>	<i>0.014</i>
Finland	—	—	—	—	0.079	0.181	0.096	0.165	0.061	0.111	0.078	0.140	0.080	0.164	0.092	0.163
					<i>0.009</i>	<i>0.012</i>	<i>0.010</i>	<i>0.011</i>	<i>0.018</i>	<i>0.019</i>	<i>0.016</i>	<i>0.020</i>	<i>0.015</i>	<i>0.022</i>	<i>0.016</i>	<i>0.024</i>
France	0.065	0.100	0.070	0.096	0.068	0.094	0.079	0.103	0.072	0.098	0.072	0.094	0.073	0.090	0.074	0.081
	<i>0.006</i>	<i>0.007</i>	<i>0.007</i>	<i>0.007</i>	<i>0.007</i>	<i>0.007</i>	<i>0.008</i>	<i>0.010</i>	<i>0.008</i>							
Germany*	0.057	0.109	0.061	0.090	0.062	0.097	—	—	—	—	—	—	—	—	—	—
	<i>0.006</i>	<i>0.010</i>	<i>0.007</i>	<i>0.010</i>	<i>0.007</i>	<i>0.010</i>	—	—	—	—	—	—	—	—	—	—
Germany**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Greece	0.327	0.491	0.314	0.460	0.307	0.435	0.308	0.434	0.342	0.398	0.321	0.383	0.328	0.364	0.307	0.347
	<i>0.015</i>	<i>0.014</i>	<i>0.016</i>	<i>0.015</i>	<i>0.017</i>	<i>0.016</i>	<i>0.017</i>	<i>0.016</i>	<i>0.020</i>	<i>0.017</i>	<i>0.019</i>	<i>0.017</i>	<i>0.020</i>	<i>0.017</i>	<i>0.019</i>	<i>0.016</i>
Ireland	0.155	0.191	0.148	0.184	0.162	0.179	0.157	0.171	0.166	0.145	0.151	0.162	0.144	0.125	0.125	0.122
	<i>0.013</i>	<i>0.013</i>	<i>0.014</i>	<i>0.014</i>	<i>0.016</i>	<i>0.016</i>	<i>0.016</i>	<i>0.016</i>	<i>0.017</i>	<i>0.015</i>	<i>0.018</i>	<i>0.019</i>	<i>0.020</i>	<i>0.019</i>	<i>0.018</i>	<i>0.018</i>

(Continued)

Table A.4 (Continued).

	1994		1995		1996		1997		1998		1999		2000		2001	
	Industry	Service														
Italy	0.233 <i>0.011</i>	0.397 <i>0.013</i>	0.248 <i>0.012</i>	0.426 <i>0.014</i>	0.232 <i>0.011</i>	0.410 <i>0.013</i>	0.228 <i>0.011</i>	0.399 <i>0.013</i>	0.215 <i>0.012</i>	0.409 <i>0.014</i>	0.214 <i>0.012</i>	0.405 <i>0.015</i>	0.222 <i>0.014</i>	0.387 <i>0.015</i>	0.216 <i>0.014</i>	0.396 <i>0.016</i>
Luxembourg*	0.018 <i>0.009</i>	0.115 <i>0.018</i>	0.016 <i>0.010</i>	0.116 <i>0.018</i>	0.018 <i>0.012</i>	0.107 <i>0.017</i>	—	—	—	—	—	—	—	—	—	—
Luxembourg**	—	—	—	—	—	—	—	—	0.049 <i>0.011</i>	0.101 <i>0.011</i>	0.052 <i>0.012</i>	0.092 <i>0.011</i>	0.057 <i>0.013</i>	0.094 <i>0.012</i>	0.052 <i>0.013</i>	0.089 <i>0.011</i>
Netherlands	0.038 <i>0.007</i>	0.076 <i>0.009</i>	0.042 <i>0.008</i>	0.075 <i>0.008</i>	0.043 <i>0.008</i>	0.084 <i>0.009</i>	0.034 <i>0.007</i>	0.083 <i>0.008</i>	0.029 <i>0.006</i>	0.077 <i>0.009</i>	0.035 <i>0.007</i>	0.074 <i>0.007</i>	0.038 <i>0.007</i>	0.073 <i>0.008</i>	0.064 <i>0.011</i>	0.067 <i>0.009</i>
Portugal	0.168 <i>0.013</i>	0.337 <i>0.019</i>	0.171 <i>0.013</i>	0.323 <i>0.018</i>	0.168 <i>0.014</i>	0.317 <i>0.019</i>	0.181 <i>0.014</i>	0.325 <i>0.020</i>	0.194 <i>0.015</i>	0.298 <i>0.020</i>	0.190 <i>0.015</i>	0.270 <i>0.015</i>	0.164 <i>0.015</i>	0.286 <i>0.021</i>	0.167 <i>0.016</i>	0.289 <i>0.023</i>
Spain	0.177 <i>0.011</i>	0.305 <i>0.011</i>	0.165 <i>0.012</i>	0.307 <i>0.013</i>	0.166 <i>0.011</i>	0.304 <i>0.013</i>	0.156 <i>0.011</i>	0.320 <i>0.014</i>	0.142 <i>0.011</i>	0.317 <i>0.015</i>	0.157 <i>0.013</i>	0.292 <i>0.015</i>	0.148 <i>0.013</i>	0.296 <i>0.017</i>	0.130 <i>0.013</i>	0.251 <i>0.015</i>
Sweden	—	—	—	—	—	—	0.099 <i>0.012</i>	0.209 <i>0.014</i>	0.111 <i>0.012</i>	0.202 <i>0.014</i>	0.106 <i>0.012</i>	0.188 <i>0.013</i>	0.076 <i>0.010</i>	0.187 <i>0.013</i>	0.106 <i>0.012</i>	0.170 <i>0.013</i>
UK*	0.175 <i>0.011</i>	0.187 <i>0.010</i>	0.178 <i>0.013</i>	0.177 <i>0.011</i>	0.189 <i>0.016</i>	0.178 <i>0.013</i>	—	—	—	—	—	—	—	—	—	—
UK**	0.175 <i>0.012</i>	0.158 <i>0.010</i>	0.183 <i>0.013</i>	0.160 <i>0.011</i>	0.182 <i>0.013</i>	0.162 <i>0.013</i>	0.161 <i>0.012</i>	0.167 <i>0.011</i>	0.137 <i>0.012</i>	0.171 <i>0.011</i>	0.144 <i>0.013</i>	0.161 <i>0.011</i>	0.139 <i>0.013</i>	0.147 <i>0.011</i>	0.152 <i>0.014</i>	0.157 <i>0.011</i>

Note: See Table 3.2. Robust Standard Errors in *italics* (estimated using sampling weights via the delta method).

*Original ECHP survey **ECHP based on national survey.

Table A.5 Entry and exit rates (relative to the stock of self-employed) for the period 1994-2001.

	1994		1995		1996		1997		1998		1999		2000		2001	
	Entry	Exit														
Austria	—	—	0.084	0.094	0.247	0.184	0.148	0.139	0.135	0.153	0.111	0.116	0.114	0.143	0.096	0.079
			<i>0.024</i>	<i>0.023</i>	<i>0.046</i>	<i>0.032</i>	<i>0.036</i>	<i>0.029</i>	<i>0.034</i>	<i>0.033</i>	<i>0.035</i>	<i>0.039</i>	<i>0.035</i>	<i>0.042</i>	<i>0.039</i>	<i>0.026</i>
Belgium	0.072	0.053	0.150	0.048	0.094	0.106	0.132	0.051	0.080	0.067	0.056	0.056	0.105	0.096	0.064	0.094
	<i>0.016</i>	<i>0.013</i>	<i>0.026</i>	<i>0.011</i>	<i>0.019</i>	<i>0.019</i>	<i>0.027</i>	<i>0.015</i>	<i>0.020</i>	<i>0.015</i>	<i>0.016</i>	<i>0.015</i>	<i>0.027</i>	<i>0.024</i>	<i>0.019</i>	<i>0.026</i>
Denmark	0.118	0.082	0.180	0.161	0.146	0.208	0.209	0.139	0.240	0.213	0.145	0.195	0.285	0.115	0.123	0.186
	<i>0.029</i>	<i>0.022</i>	<i>0.038</i>	<i>0.029</i>	<i>0.038</i>	<i>0.041</i>	<i>0.053</i>	<i>0.035</i>	<i>0.057</i>	<i>0.040</i>	<i>0.038</i>	<i>0.049</i>	<i>0.070</i>	<i>0.036</i>	<i>0.037</i>	<i>0.044</i>
Finland	—	—	—	—	0.132	0.074	0.126	0.124	0.109	0.207	0.148	0.125	0.106	0.117	0.132	0.114
					<i>0.027</i>	<i>0.013</i>	<i>0.024</i>	<i>0.017</i>	<i>0.017</i>	<i>0.021</i>	<i>0.025</i>	<i>0.018</i>	<i>0.025</i>	<i>0.021</i>	<i>0.030</i>	<i>0.020</i>
France	0.096	0.169	0.066	0.075	0.095	0.067	0.050	0.056	0.070	0.095	0.063	0.053	0.076	0.053	0.040	0.074
	<i>0.016</i>	<i>0.017</i>	<i>0.012</i>	<i>0.013</i>	<i>0.016</i>	<i>0.012</i>	<i>0.012</i>	<i>0.012</i>	<i>0.015</i>	<i>0.016</i>	<i>0.016</i>	<i>0.012</i>	<i>0.017</i>	<i>0.013</i>	<i>0.012</i>	<i>0.018</i>
Germany*	0.188	0.042	0.197	0.145	0.196	0.090	—	—	—	—	—	—	—	—	—	—
	<i>0.031</i>	<i>0.012</i>	<i>0.033</i>	<i>0.024</i>	<i>0.033</i>	<i>0.019</i>										
Germany**	0.104	0.200	0.276	0.142	0.235	0.142	0.131	0.135	0.115	0.177	0.199	0.164	0.145	0.128	0.185	0.122
	<i>0.020</i>	<i>0.036</i>	<i>0.049</i>	<i>0.022</i>	<i>0.037</i>	<i>0.039</i>	<i>0.021</i>	<i>0.022</i>	<i>0.020</i>	<i>0.034</i>	<i>0.040</i>	<i>0.026</i>	<i>0.027</i>	<i>0.022</i>	<i>0.045</i>	<i>0.027</i>
Greece	0.060	0.036	0.182	0.210	0.117	0.121	0.127	0.143	0.131	0.102	0.077	0.140	0.110	0.120	0.085	0.110
	<i>0.008</i>	<i>0.005</i>	<i>0.015</i>	<i>0.013</i>	<i>0.012</i>	<i>0.011</i>	<i>0.014</i>	<i>0.013</i>	<i>0.017</i>	<i>0.012</i>	<i>0.011</i>	<i>0.014</i>	<i>0.015</i>	<i>0.014</i>	<i>0.012</i>	<i>0.013</i>
Ireland	0.103	0.043	0.141	0.105	0.131	0.113	0.126	0.099	0.087	0.119	0.161	0.141	0.187	0.183	0.122	0.153
	<i>0.020</i>	<i>0.011</i>	<i>0.023</i>	<i>0.018</i>	<i>0.024</i>	<i>0.019</i>	<i>0.026</i>	<i>0.019</i>	<i>0.019</i>	<i>0.027</i>	<i>0.043</i>	<i>0.026</i>	<i>0.046</i>	<i>0.035</i>	<i>0.031</i>	<i>0.040</i>

(Continued)

Table A.5 (Continued).

	1994		1995		1996		1997		1998		1999		2000		2001	
	Entry	Exit														
Italy	0.082	0.117	0.227	0.134	0.150	0.123	0.146	0.137	0.146	0.138	0.135	0.108	0.127	0.114	0.114	0.093
	<i>0.009</i>	<i>0.009</i>	<i>0.017</i>	<i>0.011</i>	<i>0.012</i>	<i>0.010</i>	<i>0.013</i>	<i>0.011</i>	<i>0.014</i>	<i>0.011</i>	<i>0.013</i>	<i>0.011</i>	<i>0.014</i>	<i>0.012</i>	<i>0.013</i>	<i>0.011</i>
Luxembourg*	0.198	0.024	0.113	0.105	0.112	0.165	—	—	—	—	—	—	—	—	—	—
	<i>0.067</i>	<i>0.017</i>	<i>0.049</i>	<i>0.041</i>	<i>0.046</i>	<i>0.053</i>	—	—	—	—	—	—	—	—	—	—
Luxembourg**	—	—	0.281	0.064	0.078	0.223	0.199	0.126	0.283	0.046	0.181	0.136	0.232	0.118	0.133	0.036
	—	—	<i>0.050</i>	<i>0.019</i>	<i>0.024</i>	<i>0.033</i>	<i>0.046</i>	<i>0.030</i>	<i>0.064</i>	<i>0.021</i>	<i>0.051</i>	<i>0.037</i>	<i>0.062</i>	<i>0.038</i>	<i>0.039</i>	<i>0.018</i>
Netherlands	—	—	0.345	0.209	0.251	0.128	0.218	0.186	0.206	0.219	0.230	0.165	0.213	0.216	0.269	0.208
	—	—	<i>0.059</i>	<i>0.035</i>	<i>0.047</i>	<i>0.024</i>	<i>0.041</i>	<i>0.030</i>	<i>0.043</i>	<i>0.035</i>	<i>0.049</i>	<i>0.031</i>	<i>0.046</i>	<i>0.034</i>	<i>0.047</i>	<i>0.046</i>
Portugal	0.040	0.030	0.171	0.175	0.234	0.169	0.181	0.160	0.131	0.143	0.081	0.134	0.109	0.116	0.110	0.088
	<i>0.010</i>	<i>0.008</i>	<i>0.021</i>	<i>0.019</i>	<i>0.028</i>	<i>0.019</i>	<i>0.025</i>	<i>0.019</i>	<i>0.021</i>	<i>0.017</i>	<i>0.014</i>	<i>0.019</i>	<i>0.020</i>	<i>0.019</i>	<i>0.022</i>	<i>0.014</i>
Spain	0.079	0.082	0.234	0.201	0.201	0.187	0.185	0.177	0.156	0.149	0.201	0.213	0.151	0.160	0.141	0.220
	<i>0.010</i>	<i>0.010</i>	<i>0.021</i>	<i>0.015</i>	<i>0.019</i>	<i>0.015</i>	<i>0.021</i>	<i>0.016</i>	<i>0.020</i>	<i>0.015</i>	<i>0.024</i>	<i>0.020</i>	<i>0.019</i>	<i>0.017</i>	<i>0.021</i>	<i>0.023</i>
Sweden	—	—	—	—	—	—	—	—	1.212	0.918	1.309	0.954	1.091	0.907	1.254	0.929
	—	—	—	—	—	—	—	—	<i>0.112</i>	<i>0.019</i>	<i>0.121</i>	<i>0.016</i>	<i>0.101</i>	<i>0.020</i>	<i>0.115</i>	<i>0.017</i>
UK*	0.223	0.134	0.191	0.164	0.205	0.183	—	—	—	—	—	—	—	—	—	—
	<i>0.022</i>	<i>0.015</i>	<i>0.022</i>	<i>0.017</i>	<i>0.026</i>	<i>0.021</i>	—	—	—	—	—	—	—	—	—	—
UK**	0.144	0.223	0.189	0.143	0.183	0.153	0.162	0.171	0.140	0.198	0.181	0.164	0.174	0.173	0.197	0.178
	<i>0.018</i>	<i>0.019</i>	<i>0.024</i>	<i>0.016</i>	<i>0.022</i>	<i>0.017</i>	<i>0.021</i>	<i>0.018</i>	<i>0.020</i>	<i>0.020</i>	<i>0.025</i>	<i>0.020</i>	<i>0.025</i>	<i>0.020</i>	<i>0.028</i>	<i>0.021</i>

Note: See Table 3.4. Robust Standard Errors in *italics* (estimated using sampling weights via the delta method).

*Original ECHP survey **ECHP based on national survey.

Table A.6 Pooled entry and exit rates, 1994–2001.

	Raw		High-skilled	
	Entry	Exit	Entry	Exit
Austria	0.136 <i>0.014</i>	0.131 <i>0.012</i>	0.022 <i>0.005</i>	0.010 <i>0.003</i>
Belgium	0.095 <i>0.008</i>	0.071 <i>0.006</i>	0.038 <i>0.005</i>	0.027 <i>0.004</i>
Denmark	0.177 <i>0.016</i>	0.161 <i>0.013</i>	0.080 <i>0.010</i>	0.053 <i>0.008</i>
Finland	0.125 <i>0.010</i>	0.133 <i>0.008</i>	0.042 <i>0.006</i>	0.040 <i>0.005</i>
France	0.071 <i>0.005</i>	0.082 <i>0.005</i>	0.019 <i>0.003</i>	0.014 <i>0.002</i>
Germany*	0.194 <i>0.019</i>	0.093 <i>0.011</i>	0.071 <i>0.011</i>	0.030 <i>0.006</i>
Germany**	0.172 <i>0.012</i>	0.153 <i>0.011</i>	0.071 <i>0.007</i>	0.062 <i>0.007</i>
Greece	0.112 <i>0.005</i>	0.123 <i>0.004</i>	0.028 <i>0.002</i>	0.024 <i>0.002</i>
Ireland	0.129 <i>0.010</i>	0.111 <i>0.008</i>	0.028 <i>0.004</i>	0.016 <i>0.003</i>
Italy	0.142 <i>0.005</i>	0.121 <i>0.004</i>	0.020 <i>0.002</i>	0.014 <i>0.001</i>
Luxembourg*	0.138 <i>0.031</i>	0.101 <i>0.024</i>	0.041 <i>0.016</i>	0.052 <i>0.019</i>
Luxembourg**	0.194 <i>0.018</i>	0.114 <i>0.011</i>	0.064 <i>0.009</i>	0.034 <i>0.006</i>
Netherlands	0.245 <i>0.018</i>	0.191 <i>0.013</i>	0.029 <i>0.005</i>	0.022 <i>0.004</i>
Portugal	0.134 <i>0.007</i>	0.128 <i>0.006</i>	0.015 <i>0.002</i>	0.009 <i>0.002</i>
Spain	0.168 <i>0.007</i>	0.170 <i>0.006</i>	0.040 <i>0.003</i>	0.033 <i>0.003</i>
UK*	0.207 <i>0.013</i>	0.158 <i>0.010</i>	0.058 <i>0.007</i>	0.040 <i>0.006</i>
UK**	0.170 <i>0.008</i>	0.176 <i>0.007</i>	0.081 <i>0.005</i>	0.083 <i>0.005</i>

Note: See Tables 3.2 and 3.6. Robust Standard Errors in *italics*.

*Original ECHP survey **ECHP based on national survey.

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