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Complexity: An Empirical Analysis of 18 OECD Countries**

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Linking Business Ownership and Perceived Administrative Complexity: An Empirical Analysis of 18 OECD Countries

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ABSTRACT:

Administrative burdens are known to be a major business constraint for incumbent SMEs in modern economies. Far less is known about the influence of these burdens on the startup of new firms. The current paper examines to what extent perceived administrative complexity related to starting a new business influences the number of business owners across 18 OECD countries. We test this relationship combining data on business ownership from EIM's COMPENDIA data base and data on perceived administrative complexity from the Eurobarometer public opinion surveys coordinated by the European Commission. Our regression model enables to explicitly control for the influence of unemployment on the level of business ownership ('refugee effect'). We also control for risk tolerance and access to finance. Our results suggest that perceived administrative complexity has a negative impact on the level of business ownership. However, the effect is not immediate but rather seems to emerge in the long run.

JEL-CODES: L50, M13, O57

KEYWORDS: business ownership, administrative burdens, unemployment

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1. Introduction

Small and new firms nowadays are often considered to be the driving force behind the (developed) economies. Thurik and Wennekers (2004), Jovanovic (1982), Ericson and Pakes (1995), Audretsch (1995), Hopenhayn (1992), Lambson (1991) and Klepper (1996) suggest that entrepreneurship will stimulate and generate growth. Nevertheless, it was long believed that large firms were the driving force behind the economies in the developed countries. Traditional theories suggest that entrepreneurship will retard economic growth. Large firms could benefit, in contrast to small firms, from economies of scale and scope. Many economists believed that more large firms would lead to more economic growth and that the share of small firms eventually would disappear or reduce to only a small fraction.

In the early 1980s David Birch published research results based on a data file of all U.S. firms and their employment from 1969 through 1976. His research concluded that small firms, those with 100 or fewer employees, created 81% of the net new jobs in the United States (Birch, 1981). Although his research method was accompanied with much critique, other researchers found similar results (Gallagher and Stewart, 1986; Storey and Johnson, 1987 and Konings, 1995). Furthermore, Brock and Evans (1989) found an increase in the number of small businesses and their impact on employment in the United States in the eighties. Storey (1994) shows that small American and English firms create more employment than large firms. Thurik (1996) found that small enterprises in the fifteen member countries of the European Union (EU) have a bigger impact on economic growth than their larger counterparts. Wennekers and Thurik (1999) and Audretsch and Thurik (2000) reported similar results.

Since entrepreneurship stimulates economic growth and job creation it is also important to consider what stimulates entrepreneurial activity. If for instance the government can influence entrepreneurial activity it may indirectly influence economic progress. To understand how public policy can be implemented to stimulate entrepreneurship it is useful to consider what influences entrepreneurial activity. There are many factors that (could) have an impact on entrepreneurial activity. Entrepreneurship is shaped by many different factors, spanning a spectrum range of determinants, ranging from economic to historical, psychological, social, cultural and political. These determinants can be observed at the level of the individual, the level of the firm or at the spatial level (Audretsch, 2003).

At the *level of the individual*, the model of income choice has been the prevalent theoretical framework. This model dates back at least to Knight (1921). In its most basic form, individuals are confronted with a choice between wage-employment in an incumbent firm or generating profits by starting up a new business. The model of income choice has been extended by Kihlstrom and Laffont (1979) to incorporate aversion to risk and by Lucas (1978) and Jovanovic (1994) to show why differences in firm-size exist, which has served as the basis for many more empirical research. Evans and Leighton (1989a, 1989b and 1990) link personal characteristics such as education, experience, age and employment status of almost 4,000 white males to the decision to start a new firm. Bates (1990) and Blanchflower and Meyer (1994) link human capital to the income choice model. Storey (1991) links unemployment to the decision to start a new firm.

At the *level of the firm*, studies have mostly focused on the determinants of new-firm startups. These studies typically have been at the industry level and have tried to link industry-specific factors to start-up activity. Geroski (1995) found that industry growth contributed to more start-up

activity, Wagner (1994) found that start-up rates of new firms in Germany were higher in concentrated industries experiencing high growth.

At the *spatial level* most studies also focus on startup activity as a measure of entrepreneurship. Most investigated determinants are the unemployment rate, population density, population growth, human capital levels and enterprise structure (Audretsch, 2003). The present paper focuses on a different aspect of startup activity, namely administrative regulations. The *Observatory of European SMEs 2002, No. 7* reports that for enterprises in the former Europe-19 countries, administrative regulations represent the third most important business constraint, after lack of skilled labour and access to finance (KPMG/ENSR, 2002, Chapter 2). This relates to administrative burdens for incumbent (*i.e.*, existing) enterprises, for instance regulations concerning recruitment of employees. The current paper focuses on a different aspect of administrative burdens, namely the regulations concerning the startup of a new firm. We examine to what extent perceived administrative complexity influences the number of business owners at the country level. We investigate this for a sample of 18 OECD countries building on an empirical model employed by Audretsch *et al.* (2001). Using this model we are able to explicitly control for one of the most important determinants of entrepreneurial activity, unemployment. We also control for risk tolerance and access to finance.

The organization of this paper is as follows. In section two we give a review of the literature. Section three presents the data and focuses on several measurement issues concerning business ownership and administrative burdens. In section four our model and empirical results are described and discussed. Section five provides concluding remarks.

2. Theory

In the current paper we investigate four possible determinants of entrepreneurial activity measured at the country level: unemployment, administrative burdens, lack of financial support and risk tolerance. The relevant literature regarding these determinants is discussed below. Based on the literature we formulate hypotheses concerning the effects on entrepreneurship.

Unemployment

Unemployment is probably the most debated and investigated determinant of entrepreneurial activity. There are theoretical arguments for both a negative and a positive effect. We mention two negative effects here. First, high unemployment may be associated with a low degree of entrepreneurial activity because the unemployed tend to possess lower endowments of human capital and entrepreneurial talent required to start and sustain a new firm (Lucas, 1978). Second, a low rate of start-ups can also be caused by low economic growth levels, which correlate with higher levels of unemployment (Audretsch, 1995). There is some empirical evidence for a negative relation. Garofoli (1994) and Audretsch and Fritsch (1994) found that unemployment is negatively related to new-firm start-ups. However, Carree (2002) could not find evidence for a statistically significant relation between unemployment and entrepreneurship.

There are also arguments for a positive relation. Some economists argue that increased unemployment will lead to an increase in start-up activity on the grounds that the opportunity cost of starting a business has decreased (Blau, 1987; Evans and Jovanovic, 1989; Evans and Leighton, 1990; Blanchflower and Meyer, 1994). The (positive) effect of unemployment as a stimulator of entrepreneurial activity is often labelled as the 'refugee-effect'. The precursor of the refugee-effect

dates back to Knight's (1921) view that individuals make a decision among three states; unemployment, self-employment and wage-employment. This means that when there are high levels of unemployment, people often see their decisions among the mentioned three stages reducing to two: self-employed or unemployed. Because the number of unemployed by choice is nearly static in both cases¹, increased unemployment could very well lead to increased entrepreneurial activity. In line of this, Oxenfeldt (1943) argued that individuals with unemployment and low prospects for wage-employment turn to self-employment as a viable alternative. Audretsch *et al.* (2001), Reynolds *et al.* (1995), Reynolds *et al.* (1994), Hamilton (1989) Highfield and Smiley (1987), Yamawaki (1990) and Evans and Leighton (1989b and 1990) also found empirical evidence supporting the refugee effect. As the empirical evidence for a positive effect dominates, we expect a positive effect of unemployment on entrepreneurial activity.

Administrative burdens

In economic literature there is no standard definition of administrative burdens because the definition is rather complex and difficult (Nicoletti *et al.*, 2000). Nevertheless, OECD (2001) concludes that administrative burdens have risen significantly in OECD countries in recent years due to expanding regulations and increasing government demands for information. In this context, the terms 'regulations' and 'increasing government demands for information' serve as a description of what is meant by administrative burdens. In another OECD-publication administrative regulations are described as paperwork and administrative formalities by which governments collect information and intervene in individual economic decisions (OECD 2000). All in all, the description of how administrative burdens is defined or can be measured depends on the field of research it is applied to. Krauss and Stahlecker (2001) showed that one of the main factors underlying the slow development of biotechnology in Germany was government restrictions and administrative burdens. As these restrictions loosened, the number of biotechnology firms, and the growth of these firms, increased greatly.

Grilo and Thurik (2004) show that administrative complexities play a significant role in explaining entrepreneurial drive. They find that relative to never having considered setting up a business, the odds of 'thinking about it' or 'having thought about it and given up' are not significantly affected by the perception of administrative complexity. However, the odds of other more active entrepreneurial positions ('about to start up a business' or 'recently set up a business') are significantly negatively affected by a perception of administrative complexity. Grilo and Thurik (2004) therefore argue that perhaps for the first two categories the recognition of such obstacles is not binding enough to make them statistically different from those never having considered being self-employed. What is revealing about these results is that when it comes to a more 'engaged' entrepreneurial position, these obstacles do play a role and one that hinders entrepreneurship. Administrative complexity causes more effort on behalf of the entrepreneur. Many potential entrepreneurs could lose interest in setting up a business because of the complexities associated with starting a firm. We therefore expect 'administrative complexity' to have a negative impact on entrepreneurial activity.

¹ The number of people who choose to be unemployed is not expected to change much if the decision of the three states (unemployment/ self-employment/ wage-employment) reduces to two (self-employment/ unemployment). Most people need a job to provide themselves a living.

Finance

A large body of literature is devoted to the role that access to finance plays in determining entrepreneurship. Stiglitz and Weiss (1981) showed that as a result of adverse selection, the likelihood of credit rationing tends to systematically increase as firm size decreases. Furthermore, Fazzari *et al.* (1988), in their empirical study of the United States, found systematic evidence that liquidity constraints tend to be more binding as firm size decreases. Evans and Jovanovic (1989) show that under certain conditions, due to capital constraints, there is a positive relationship between the probability of becoming self-employed and the assets of the entrepreneur. Blanchflower and Oswald (1998) find empirical evidence for the U.K. for a positive impact of inheritance or gifts received by the surveyed individuals on their probability of becoming self-employed. Based on this evidence we expect lack of financial support to have a negative effect on entrepreneurship. However, Grilo and Irigoyen (2002) and Grilo and Thurik (2004) argue that perceived lack of financial support does not seem to have a significant impact on the revealed preference towards self-employment.

Risk tolerance

We will also include a measure of risk tolerance in our model. It is often argued that entrepreneurs are risk-seekers and therefore that entrepreneurship is related to risk seeking behavior (Kihlstrom and Laffont, 1979, Iyigun and Owen, 1998, McGrath *et al.*, 1992). Grilo and Irigoyen (2002) document that risk tolerance plays a positive role both in wanting to be and in being self-employed. We expect risk tolerance to be positively related to entrepreneurial activity.

3. Data and Measurement Issues

In this section we describe our data. We also pay attention to the importance of distinguishing between different measures of administrative burdens.

Measuring entrepreneurship

Operationalizing entrepreneurship for empirical measurement is difficult for at least two reasons (Storey, 1991). First, there is no straightforward definition of the term entrepreneurship, so how should it be measured? Second, in the case of cross-country analysis, even proxy measures used for entrepreneurial activity differ across countries. To measure entrepreneurial activity, economists usually use the number of self-employed. Although the measure of self-employment is accompanied with much critique², measures of self-employment are widely used to reflect the degree of entrepreneurial activity, largely because they are measured in most countries, and measured in comprehensive facilitating comparisons across countries and over time (Blau, 1987).

Nevertheless, Van Stel (2003) argues that the comparability of international self-employment data is a major problem, because each country uses its own self-employment definition. In

² As Audretsch (2003) states: “Measures of self-employment reflect change that is occurring at least for the individual starting a new business. That very little of this change is projected onto the larger industry, nation or global market has long resulted in the criticism of self-employment as a measure of entrepreneurial activity.”

particular, the extent to which owner/managers of incorporated businesses (OMIBs) are included in the self-employment counts as published in *OECD Labour Force Statistics*, differs across countries. In recent years, EIM has made an attempt to construct an international data base with (macro) self-employment figures for 23 OECD countries that are comparable across countries. This data base is called COMPENDIA (COMParative ENtrepreneurship Data for International Analysis). The definition used in COMPENDIA includes owner/managers of both unincorporated and incorporated businesses and excludes unpaid family workers. Furthermore, so-called 'side-owners' (self-employment as a secondary activity) and business owners in the sectors agriculture, hunting, forestry and fishing are also excluded.

In COMPENDIA the business ownership rate is defined as the number of business owners (as defined above) divided by total labor force. In this paper this business ownership rate will be used as measure for entrepreneurial activity.

There are a number of important qualifications that should be emphasized when using business ownership rates. First, it lumps together all types of heterogeneous activity into one measure. This measure treats all businesses as the same, both high-tech and low-tech. Second, business ownership rates are not weighted for impact. Again, all firms are measured identically, while some businesses obviously have more impact than others. Third, it measures the stock of firms and not the start-up of new ones (Audretsch, 2003). Nevertheless, this measure has two significant advantages. The first is that, while not being a direct measure of entrepreneurial activity, it is a good proxy (Storey, 1991). Second, it can be measured across countries and over time and these measures can be compared.

In Table 1 the business ownership rates are given for 2002 for the 18 countries in our sample. Business ownership rates are high in the Mediterranean countries, especially Greece and Italy, and low in the Scandinavian countries and Luxembourg.

Table 1 also displays unemployment rates for 2002. These are also taken from the COMPENDIA data base. The definition is that of the 'standardised unemployment rate', as practiced by OECD (publication Main Economic Indicators), completed by information from OECD Labour Force Statistics for missing countries. Unemployment rates are high in Spain, Italy, Greece, Finland, France and Germany (above 8.5%) and low in Iceland, Netherlands and Luxembourg (below 3%).

Table 1: Business ownership rates and unemployment rates for 18 OECD countries in 2002

Country	Business ownership rate	Unemployment rate
Austria	0.083	0.043
Belgium	0.113	0.073
Denmark	0.067	0.045
Finland	0.079	0.091
France	0.081	0.088
Germany	0.086	0.086
Greece	0.193	0.088
Ireland	0.112	0.044
Italy	0.183	0.090
Luxembourg	0.054	0.028
The Netherlands	0.108	0.028
Portugal	0.137	0.051
Spain	0.129	0.113
Sweden	0.081	0.052
United Kingdom	0.107	0.051
Iceland	0.123	0.023
Norway	0.065	0.039
United States	0.095	0.058

Source: COMPENDIA 2002.1.

Measuring administrative burdens

In this paper we use three variables from the *Eurobarometer* public opinion surveys which are coordinated by the European Commission. Next to a measure of administrative burdens called administrative complexity this involves the variables risk tolerance and lack of financial support. Risk tolerance is a preference variable, lack of financial support and administrative complexity are perception variables (perception of obstacles to new-firm startups).

The variables risk tolerance, lack of financial support and administrative complexity are constructed from an inquiry among citizens of 15 years and older, based on the following questions:

Do you strongly agree, agree, disagree, or strongly disagree with the following statements?

- 1 One should not start a business if there is a risk it might fail.
- 2 It is difficult to start one's own business due to a lack of available financial support.
- 3 It is difficult to start one's own business due to the complex administrative procedures.

Risk tolerance is measured as the share of respondents indicating to 'disagree' or 'strongly disagree' with statement 1. Although this is a rough indicator of risk attitude, it should give us some insight on how taking risks is perceived by the respondents. Lack of financial support and administrative complexity are measured as the share of respondents who 'agree' or 'strongly agree'

with statements 2 and 3, respectively. These two statements capture the perception individuals have of the existence of financial or administrative barriers for starting up a new firm.

The data for administrative complexity, lack of financial support and risk tolerance are presented in Table 2. Portugal, Denmark, France, Sweden and Italy are the five countries with the highest perception of administrative complexity (values above 0.8) while relatively low values (below 0.7) are found for The Netherlands, Austria, Iceland and the United States.

Lack of financial support seems to be perceived as a barrier for new-firm startup mostly in the Mediterranean countries. Greece (0.892), Portugal (0.880) and Italy (0.873) are the three countries with the highest perception of lack of financial support. France and Spain are also way above the average. The Netherlands (0.59) is by far the country with the lowest perception of lack of financial support. Other countries with a low perception of liquidity constraints are Finland and Norway.

Risk tolerance, finally, is highest in Ireland (0.736) and the United States (0.711) while, according to Table 2, the most risk averse countries are Norway (0.356), Portugal (0.410) and Austria (0.433).

Table 2: Determinants of entrepreneurial activity for 18 OECD countries

Country	Administrative complexity	Lack of financial support	Risk tolerance
Austria	0.683	0.732	0.433
Belgium	0.799	0.819	0.467
Denmark	0.846	0.758	0.596
Finland	0.711	0.651	0.558
France	0.822	0.859	0.597
Germany	0.761	0.805	0.504
Greece	0.762	0.892	0.534
Ireland	0.731	0.751	0.736
Italy	0.810	0.873	0.546
Luxembourg	0.754	0.815	0.496
The Netherlands	0.655	0.590	0.519
Portugal	0.869	0.880	0.410
Spain	0.768	0.835	0.569
Sweden	0.819	0.843	0.464
United Kingdom	0.721	0.709	0.663
Iceland	0.544	0.692	0.547
Norway	0.761	0.613	0.356
United States	0.685	0.780	0.711
Weighted average	0.745	0.777	0.544

Source: *Flash Eurobarometer 134 and 146* (average 2002 and 2003), European Commission.

Different administrative burden measures for different purposes

As was argued in Section 2, the definition of administrative burdens is rather complex and the definition used should be dependent on the field of research it is applied to. In this subsection we will argue that for investigating the actual startup decision of potential entrepreneurs (which, in

turn, impacts the number of business owners at country level), it is the ‘administrative complexity’ type of variable as used in this study, that is the relevant measure of administrative burdens. We do this by comparing this measure with two alternative measures which circulate in leading economic reports, the *Observatory of European SMEs 2002, No. 7* and the *Global Competitiveness Report 2001-2002*.

From Table 2 we see that Portugal and Italy are among the countries with the highest proportions of citizens considering the ‘complex administrative procedures’ to be an important constraint for setting up a business. However, according to the *Observatory of European SMEs 2002, No. 7*, Portugal and Italy are among the four countries in Europe-19 with the lowest percentages of SMEs indicating administrative regulations to be a major business constraint (KPMG/ENSR 2002, p. 14). Two possible explanations may account for this difference. First, it is a different type of administrative regulations, namely regulations that apply to incumbents (as opposed to new-firm startups), for instance, regulations concerning recruitment of employees. Second, the survey of the *Observatory* is a survey held among firms while the *Eurobarometer* is a survey held among citizens. Although firms may have a better view of the *actual* administrative complexity in a country, it may be argued that the *perceived* administrative complexity is the relevant measure for investigating the impact on the number of startups, as this is the information which the potential entrepreneur actually uses in its startup decision. Apparently, in Portugal and Italy administrative complexities are not considered a major business constraint once the firm is started, but the perception of administrative complexities involved in starting up the firm may discourage potential entrepreneurs to set up their own business.

A second illustration of the importance of distinguishing between perceived and actual administrative complexity is provided by comparing Table 2 with the variable ‘administrative burden for startups’ from the *Global Competitiveness Report 2001-2002* (Porter *et al.*, 2002, p. 411). This variable is based on the Executive Opinion Survey operated by the Global Competitiveness Report (GCR), which is also a survey among firms. It may be argued that this variable is a better measure of actual startup-related administrative complexity as existing firms may have a better view of the business environment through experience. Again, for some countries there are striking differences between the Eurobarometer measure and the GCR measure. For instance, while Sweden has a relatively high administrative complexity according to Table 2, it has the fourth lowest value in the GCR.³ To the contrary, while Austria has a relatively low value according to the Eurobarometer, it has a relatively high administrative complexity according to GCR. For 17 countries in Table 2 the correlation between these two measures is 0.53.⁴ This may be seen as a low value considering that the only difference between the two surveys is the survey population: citizens or firms.

The above examples illustrate the importance of distinguishing between different ‘administrative burdens’ definitions. In the present paper we use administrative complexity as perceived by randomly chosen citizens. Perceived complexity is the information that is actually used in the startup decision by potential entrepreneurs, irrespective of whether or not the information is correct.

³ According to GCR, it takes 25 days in Sweden to start a new firm. For comparison: this number is 105 in Italy.

⁴ Luxembourg is not in the GCR.

4. Model and Empirical Results

The hypotheses posed in Section 2 are tested using a two-equation model. The two equations are estimated successively. As we have seen in Section 2, there is a lot of debate about the effect of unemployment on entrepreneurship, as there are both positive and negative effects. There is also debate about the direction of causality. Audretsch *et al.* (2001) find empirical evidence for both a positive effect of unemployment on business ownership (refugee effect) and a negative effect of business ownership on unemployment (Schumpeter effect). To control for these important effects, we first estimate an equation explaining the change in business ownership from lagged change in unemployment and lagged change in business ownership. This is based on Audretsch *et al.* (2001). Next, in a second equation we use the 2002 residuals from the first equation as a dependent variable and explain the variation in these residuals by risk tolerance, lack of financial support and administrative complexity. In this way we explicitly control for the effect of unemployment, which enables straightforward interpretation of the results for the other three determinants investigated in this paper.

The organization of this section is as follows. First we discuss the model by Audretsch *et al.* (2001), and provide an update of their results, using more recent data. Second, we present the results of the second equation linking the residuals from the updated Audretsch *et al.* regression to risk tolerance, lack of financial support and administrative complexity.

The impact of unemployment on business ownership

In Audretsch, Carree and Thurik (2001) the impact of unemployment on business ownership is modelled in the following way:

$$(1) E_{it} - E_{i,t-L} = \kappa + \lambda(U_{i,t-L} - U_{i,t-2L}) + \mu(E_{i,t-L} - E_{i,t-2L}) + \varepsilon_{it},$$

where $E_{it} - E_{i,t-L}$ represents the change in the rate of business ownership, i is a country-index, L is the time span in number of years and t stands for time measured in years. $U_{i,t-L} - U_{i,t-2L}$ denotes the change in the rate of unemployment. The expected sign of the coefficient λ is positive (refugee-effect). The lagged endogenous variable is used on the right hand side to correct for reversed causality.⁵

⁵ Equation (1) is testing for Granger-causality. The Granger (1969) approach to the question whether x causes y is to see how much of the current y can be explained by past values of y and then to see whether adding lagged values of x can improve the explanation. y is said to be Granger-caused by x if x helps in the prediction of y , or equivalently if the coefficients on the lagged x 's are statistically significant.

Audretsch *et al.* (2001) made use of the COMPENDIA data set, which is also used in the present paper. However, they used an older version of the data set (version 2000.1), using data for 23 OECD countries over the period 1974-1998. Table 3 presents the results when the most recent data currently available (up to and including 2002) are used (data from COMPENDIA 2002.1).

Table 3: Determining the change in rate of self-employment, $E_t - E_{t-L}$ using equation (1) for 23 OECD countries

		lag structure				
	L	6 years	8 years	10 years	12 years	14 years
Constant	κ	-0.001 (0.8)	-0.003 (1.9)	-0.005 (2.8)	-0.011 (3.4)	-0.018 (3.5)
$U_{t-L} - U_{t-2L}$	λ	0.077 (2.0)	0.205 (3.7)	0.198 (4.1)	0.241 (2.1)	0.292 (3.3)
$E_{t-L} - E_{t-2L}$	μ	0.411 (4.3)	0.352 (3.3)	0.357 (3.0)	0.303 (1.9)	0.360 (1.7)
R-squared		0.20	0.26	0.36	0.30	0.36
Observations		92	69	46	23	23

Note: Absolute t-values are between brackets. The results are from a weighted least squares regression using population as weighting variable.

In congruence with Audretsch *et al.* (2001) we find that unemployment has a positive impact on subsequent self-employment for all five time lags, which is in line with many earlier findings, as was reported in Section 2. This is the ‘refugee’ or ‘shopkeeper’ effect of unemployment stimulating start-up and self-employment rates. The results here indicate that this positive impact is larger when longer time lags are incorporated.

The three other determinants of entrepreneurial activity (administrative complexity, lack of financial support and risk tolerance) are available for 18 of the 23 countries used in Table 3 only. Therefore we re-estimate equation (1) for the 18 countries. Results are in Table 4.

Table 4: Determining the change in rate of self-employment, $E_t - E_{t-L}$ using equation (1) for 18 OECD countries

		lag structure				
	L	6 years	8 years	10 years	12 years	14 years
Constant	κ	0.001 (0.6)	-0.000 (0.1)	-0.002 (0.7)	-0.005 (1.1)	-0.006 (0.9)
$U_{t-L} - U_{t-2L}$	λ	0.071 (1.8)	0.168 (3.1)	0.162 (3.4)	0.192 (1.7)	0.165 (1.8)
$E_{t-L} - E_{t-2L}$	μ	0.333 (2.9)	0.228 (1.7)	0.191 (1.4)	-0.028 (0.1)	-0.081 (0.3)
R-squared		0.13	0.17	0.27	0.17	0.27
Observations		72	54	36	18	18

Note: Absolute t-values are between brackets. The results are from a weighted least squares regression using population as weighting variable.

Similar results are found in Table 4 compared to Table 3. Although the effects are somewhat less strong, Table 3 still provides convincing evidence for the refugee effect. Again, the effect is strongest when a lag of eight years or longer is used.

Linking administrative complexity to business ownership

To link the variables risk tolerance, lack of financial support and administrative complexity to business ownership, we use the residuals of equation (1) for 2002. We use 2002 residuals because the explanatory variables are also measured in 2002/2003. In this way we investigate whether risk tolerance (RT), lack of financial support (LF) and administrative complexity (AC) influence entrepreneurial activity while we have explicitly controlled for the effect of unemployment. The following equation is estimated:

$$(2) \quad \hat{\varepsilon}_{i,2002} = \beta_0 + \beta_1 RT_{i,2002} + \beta_2 LF_{i,2002} + \beta_3 AC_{i,2002} + v_{i,2002},$$

where the dependent variable represents the residuals of equation (1) in 2002 for the 18 countries listed in Tables 1 and 2.⁶ We estimate equation (2) using residuals from the five specifications from Table 4, *i.e.*, using time lags of 6, 8, 10, 12 or 14 years.⁷

Results are in Table 5. When a six-year time span is used in equation (2), the explanatory power is low. However, when the longer time spans of eight, ten, twelve and fourteen years are used the explanatory power increases.⁸ This suggests that long-run effects may be important.

⁶ We could also have included RT, LF and AC directly in equation (1). However, in that case we would have had five independent variables for only 18 observations (as RT, LF and AC are measured at one point in time only). Also, the estimated relationship between business ownership and unemployment would have been less reliable as it would have been based on less observations. A disadvantage of our two-step approach is that the Granger-causality property of RT, LF and AC is not directly guaranteed. However, additional test regressions incorporating RT, LF and AC directly in equation (1) yield similar results to those reported in Table 5, *by and large*.

⁷ It is implicitly assumed that the variables risk tolerance, lack of financial support and administrative complexity change very slowly over time, as these independent variables are actually not measured with a time lag.

⁸ We also ran equation (2) with the business ownership level in 2002 as dependent variable and we found an R^2 value of 0.19. This is a relatively low value, compared to those reported in Table 5 (only the six year lag specification has a similarly low R^2), which illustrates that it is actually important to use a specification in *differences*, and to control for unemployment, as is done in equation (1).

Table 5: Regression results equation (2)

	lag structure				
	6 years	8 years	10 years	12 years	14 years
Constant	0.025 (0.9)	0.066 (1.6)	0.153*** (3.5)	0.155*** (3.4)	0.153** (2.5)
Risk tolerance	-0.018 (1.0)	-0.054* (2.1)	-0.081** (2.9)	-0.113*** (3.9)	-0.105** (2.7)
Lack of finance	-0.023 (0.8)	-0.004 (0.1)	-0.040 (0.9)	0.001 (0.01)	-0.000 (0.0)
Administrative complexity	-0.003 (0.1)	-0.047 (0.8)	-0.099 (1.6)	-0.117* (1.9)	-0.119 (1.4)
R ²	0.18	0.28	0.53	0.57	0.39
N	18	18	18	18	18

Note: Regression for 18 OECD countries for 2002. Absolute t-values are between brackets. The results are from a weighted least squares regression using population as weighting variable.

* = significant at 10% level, ** = significant at 5% level, *** = significant at 1% level.

Risk tolerance has a negative impact on business ownership which is statistically significant for all time lags except for the six-year lag. This result seems counterintuitive. However, if we view the risk tolerance measure as an (inverse) measure of uncertainty avoidance of a country, the result might be explained by a lack of possibilities for intrapreneurship in large organizations. For instance, for a selection of OECD countries Wennekers *et al.* (2003) find that uncertainty avoidance is positively related to business ownership and they argue that a climate of uncertainty avoidance in large organizations pushes enterprising individuals towards self-employment. Lack of financial support is negatively related to entrepreneurial activity for 4 of the 5 time lags. However, the coefficient is never significant. This is in line with results from Grilo and Thurik (2004) who also found no relationship between finance and entrepreneurial activity.

Administrative complexity has a negative impact on business ownership for all 5 time lags. For lags six and eight the results are not significant. However, for a time lag of twelve years we find a statistically significant negative impact. For lags of 10 and 14 years the coefficient is almost significant⁹ and these coefficients are in the same order of magnitude as the coefficient for the 12-year lag. Therefore we consider the effect of perceived administrative complexity robust. Apparently, there is a time-lag involved in the impact of administrative complexity on the decision to become entrepreneur. This may be an indication that our assumption that (perceived) administrative burdens change very slowly over time, is actually correct for most countries.

⁹ P-values are below 0.2, which may be considered quite low considering the small number of observations (18). Also, we test two-sidedly. If we would test one-sidedly (as there exist no arguments for a positive hypothesis, as far as we are aware of), the 10 and 14 year lag results would be considered 'more significant'.

5. Conclusion

In this paper we investigated the effect of administrative complexity on business ownership for a panel of 18 OECD countries. We also investigated three other determinants: risk tolerance, lack of finance and unemployment.

We find that administrative complexity is negatively related to business ownership. When administrative procedures related to business startup are complex, potential entrepreneurs are discouraged to start a new firm. We find this effect to be especially prevalent in the long run. We also pay attention to different measures of administrative burdens and the importance of distinguishing between *actual* and *perceived* administrative complexity. Our results are supported by Grilo and Thurik (2004). They report that the numbers of people who are about to set up a new business or recently had set up a business are negatively affected by administrative complexities. Our results suggest that it is not only important to reduce administrative burdens in order to increase the number of new firms, but that it is also of importance for governments to communicate existing administrative regulations to a country's population. The current paper has illustrated that for some countries there is a gap between perceived and actual administrative complexity. As it is perceived administrative complexity that influences the decision to set up shop, it is of major importance to reduce this gap.

Our regression exercises also suggest that lack of financial support hardly has any influence on the decision of people to start a business. Potential entrepreneurs don't seem to be hindered in their start-up decision by a lack of financial support. For risk tolerance we find a negative impact on entrepreneurial activity, which seems counterintuitive. Nevertheless, if we view risk tolerance as an (inverse) measure of uncertainty avoidance of a country, the result might be explained by a lack of possibilities for intrapreneurship in large organizations. Our paper also confirms earlier empirical evidence by Audretsch *et al.* (2001) for the 'refugee' effect of unemployment stimulating start-up and self-employment rates. Using the most recent business ownership and unemployment data currently available (up to and including 2002) we find a positive and statistically significant effect of changes in unemployment on subsequent self-employment. People with unemployment and low prospects for wage-employment turn to self-employment as a viable alternative to provide themselves a living.

A limitation of our research is that, due to data constraints, the temporal specification of our independent variables is not ideal. We are not able to measure the independent variables in a period preceding the period for the dependent variable. Instead we have to rely on the assumption that the variables risk tolerance, lack of financial support and administrative complexity do not change very fast over time. Therefore the findings in this paper should be regarded as exploratory.

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