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In search of the marginal entrepreneur: Benchmarking regulatory frameworks in their effect on entrepreneurship

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Abstract

This paper develops a benchmarking method in order to assess how legal and regulatory frameworks provide adequate incentives for entrepreneurship. The analysis is based on a dataset that combines individual data on entrepreneurship with indicators about the restrictiveness of regulations. The subjective aspect of entrepreneurial ventures is controlled for using a variable that captures the expectations of entrepreneurs regarding their businesses. This makes the marginal effect of regulation observable. Moreover, a distinction between different types of entrepreneurs allows to search for possible transmission channels of regulatory influences. The method is static and designed for cross-country comparisons and can be used to identify policy areas which are successfully applied in certain countries.

1 Introduction

The transition of Western societies from manufacturing societies to innovation societies is one of the major challenges of globalization. Policy makers around the globe thus strive to create adequate conditions for this transition. In the search for the perfect innovation environment cross-country comparisons have become an important tool as they allow to learn from the experiences in other countries and reduce political risk. While there exists an extensive literature about how regulation influences macroeconomic performance and innovation at the aggregate level, little is known about how regulation affects entrepreneurship and innovation at the micro level. In fact, as suggested by Aghion and Howitt (1992) and Acs et al. (2004), new entrepreneurial activities play a crucial role in the process of creative destruction that fosters innovation, employment, and growth.

This study combines micro level and macro level data so as to model the entrepreneurial decision as being determined by personal characteristics of individuals, their expectations, and their respective economic and regulatory environment. The advantage of working with individual data is that decisions themselves can be observed. Thus, no assumptions about aggregate or representative behavior have to be made. Furthermore, the regulatory and economic environment of the respondents can literally be seen as an incentive structure and the corresponding variables are hence exogenous to the individual decision. And most importantly, when the individual context is controlled for the effect of regulation can be analyzed in the surroundings of the marginal entrepreneur. That is, the microeconomic view allows to isolate the effect of regulation so that it can be studied where its impact is maximal, namely for those individuals who are, microeconomically speaking, indifferent regarding their entrepreneurial undertaking.

To do so the present study uses an expectations variable as the leading explanatory variable for each individual's personal context. This variable is defined using the individuals' estimations about how many employees their business venture will sustain in the future. It is argued that this personal assessment proxies the individual circumstances under which the entrepreneurial project emerges, which, in turn, are at the heart of entrepreneurship as a phenomenon. This study thus gives full credit to the subjectivity literature on entrepreneurship as represented by e.g. Kirzner (1973, 1979). The data on entrepreneurship are obtained from the 2001-2003 adult population survey of the Global Entrepreneurship Monitor (GEM). In that survey individuals are asked on the basis of a standardized questionnaire whether and in how far they engaged in entrepreneurial activities in the year preceding the interview. These data are then combined with country-specific regulation indicators from the OECD and other variables that describe the macroeconomic conditions on a national level. The regulation variables describe the restrictiveness of regulations in the labor market, the product market and the level of taxation. Furthermore, social legislation and active labor market policies are included. The interplay between the individual decisions and the regulatory and economic conditions is analyzed.

The advantage of using standardized data as from the OECD and the GEM is that the effect of institutions becomes internationally comparable. It can thus be researched whether the regulatory environment has an effect on entrepreneurial activity and which regulatory elements are influential. Yet, the objective of this paper is not to analyze the impact of policy reforms nor can direct policy advice be derived from a transnational study. The objective of this study is to benchmark international legal frameworks against each other so as to determine which policy areas are the limiting or enhancing factors for entrepreneurship in a cross country comparison.

The paper is organized as follows. Section 2 gives a brief overview over the literature

while Section 3 describes the data and the concept of entrepreneurship that this study is based on. The methodological approach is outlined in Section 4. The results are presented in Section 5. Section 6 concludes and gives remarks about the current state of progress.

2 Relation to the literature

One of the first empirical studies about the effect of regulation on entrepreneurship was done by Hoffmann (2007) who also uses entrepreneurship data from the GEM and sets them into perspective with regulation indicators from the World Bank and the OECD. His methodological approach, however, is different from the present one in that he aggregates the individual data into sets of entrepreneurship performance indicators and subsequently examines the individual correlations between the performance indicators and the regulation indicators. He finds that personal income taxation, restart possibilities, labor market regulation, and entrepreneurial education are significantly correlated with over 90% of the performance indicators while, among others, administrative regulation is never significant. Entry barriers and business taxation are significant in approximately 50% of the cases. Hoffmann (2007) points out that, ideally, the relative importance of the different policy areas should be determined by a multi-variate analysis. The present study can be seen as contributing to this discussion.

A more recent, multivariate study comes from Ardagna and Lusardi (2008) who model entrepreneurial activity on the basis of micro and macro level data. Their methodological approach, however, differs largely from the one presented here. For instance, Ardagna and Lusardi (2008) control for the level of regulation using dummy variables for countries and years. The effect of regulation is therefore measured via interaction terms of regulation indicators and individual characteristics. Moreover, different fields of regulation and different types of entrepreneurs are studied in separate regressions. This, however, may distort the randomness of the sample and limits the insights into the relative importance of the regulatory aspects.

The present study develops a new method that allows to study a comprehensive set of regulation indicators simultaneously. Furthermore, this method emphasizes the subjective element in the entrepreneurial decision, which has been identified as an important factor by e.g. Koellinger et al. (2007).

3 Data and Descriptive Statistics

3.1 GEM micro survey data

The GEM data on entrepreneurship are based on standardized surveys that are conducted on the national level by professional survey firms. Every year each survey firm is requested to generate a sample of at least 2000 observations per country and to weight the data in order to render the sample nationally representative. The surveys allow to identify individuals who have engaged in different kinds of entrepreneurial undertakings in the year preceding the interview. Those individuals who are identified as entrepreneurs are further asked to qualify the nature of their business and to identify the circumstances under which it emerged. Moreover, for the entire sample a set of personal characteristics are reported.

The definition of entrepreneurship used by the GEM sees entrepreneurship as a process and not as a single event. This reflects that, while enterprise formation obviously happens at a point in time, the planning phase and the persistence of young firms are considered as equally important elements of entrepreneurship. Figure 1 depicts a model of this definition. Entrepreneurs are thus individuals who (1) have in the last twelve months, alone or with others, tried to start a new business, including any type of self-employment or (2) are currently managing a business that has not paid salaries for more than 42 months. Starting a business implies an active contribution to the venture such as looking for equipment or a location, organizing a start-up team, working on a business plan or beginning to save money. The rate of total entrepreneurial activity (TEA) is subsequently defined as the percentage of the population who belongs to one of the above categories. TEA serves as the dependent variable in this study. It is emphasized that TEA is an *activity* measure which comprises individuals who are entrepreneurially active and not only those who are on the point of starting a business. This notion of entrepreneurship is particularly suited when studying the effect of policy on entrepreneurship since the survival of young businesses is a critical aspect of successful innovation policies and since regulations may have effects not only in the start-up phase of entrepreneurship. Further details about the data collection and the methodology of the GEM surveys are given in Reynolds et al. (2005).

Two aspects of the GEM survey are of particular relevance for this study. Respondents who indicate to be entrepreneurially active are asked to indicate how many employees they have at present and how many employees they expect to have five years after the interview. The difference between these numbers is used as a variable that captures the expectations of the respondent regarding the entrepreneurial venture (see Section 4). Secondly, the dataset allows to distinguish between entrepreneurs who pursue a perceived business opportunity and others who start a business because no other work

option was available. This information will be used to examine whether different types of entrepreneurs respond differently to regulatory constraints (see Section 4.2).

The GEM dataset of the 2001-2003 populations survey contains 287,131 interviews from 58 different countries. Since only a subset of countries are included in this study the number of observations is 87,085. In this sample the percentage of entrepreneurs amounts to 6.6 percent while 5.6 percent indicated to be opportunity entrepreneurs and 1 percent indicated to act out of necessity. Comparisons with other databases on entrepreneurship show that the GEM data capture entrepreneurship in a similar scope as data provided by the European Commission and the World Bank. For a discussion of the differences see Ardagna and Lusardi (2008), Reynolds et al. (2005), and Acs et al. (2007).

3.2 OECD regulation data

For each country, the regulatory environment is modeled by a set of indicators that describe the restrictiveness of regulations in the labor market and the product market. All indicators are composites of standardized sub-indicators which describe the legal provisions of the countries in greater detail. For example, the indicator about the complicatedness of the dismissal of an employee (“Dismissals”) is created from measures about the complicatedness of the notification procedures and the criteria according to which a dismissal is legal. The sub-criteria enter the indicator as weighted sum with weights (here 1/2 each) being computed by principle component analysis. Further variables that describe regulations in the labor market are indicators about the admissibility of fixed-term contracts and the employment through temporary work agencies. Minimum wage legislation is captured by a variable that contains the ratio of the mandatory minimum wage and the median wage of a fully employed worker. Countries that lack a minimum wage legislation are ascribed missing observations since often tacit or non-governmental agreements are in place.¹ The variables for the product market describe direct government control of business activities, the administrative burden on start-ups, legal barriers to competition, and others. The definitions of all variables that are used in this study are given in the appendix. The theoretical range of the OECD indicators goes from zero (least restrictive) to 6 (most restrictive). Details about how the indicators for the product market are computed can be found in Conway et al. (2005). Background material on the labor-market indicators is given in OECD (1999, Chap. 2).

¹At the present stage this study is confined to the set of OECD countries where a minimum wage legislation is in place. These countries are Australia, Belgium, France, Ireland, Japan, Korea, New Zealand, the Netherlands, Portugal, Spain, United Kingdom, and the United States. For a discussion see Section 6

The OECD regulation indicators are reported in intervals of five years and are available for the years 1998 and 2003. Figure 2 shows the respective values of two indicators of the product market. A general tendency towards deregulation can be established. To obtain the values for the years 2001 and 2002 all indicators are linearly interpolated between 1998 and 2003. Figure 2 and equivalent graphs for other fields of regulation further allow to benchmark the countries in terms of the respective regulations. The policy areas for which the indicators have significant effects should thus be scrutinized for improvement in the countries that exhibit the strongest (or weakest) regulations. Further variables included pertain to the social legislation, active labor market policies and taxation. In particular, the benefit replacement ratio, public expenditure on start-up incentives, and the level of small-business tax are used as regressors. The economic environment is controlled for using data on GDP growth data and a variable that describes the entrepreneurial culture in each country. The culture variable is taken from the GEM expert survey (2003). The exact definitions of the variables are given in the appendix. Tables 2, 3, and 4 show that the correlations between the different indicators are moderate.

4 Methodology

The regulatory and legal conditions of an economy constitute an incentive structure that is effectual on the microeconomic level. In the following the entrepreneurial decision is thus modeled as being determined by the personal characteristics of individuals, their expectations, and their economic and regulatory environment. By controlling for the individual context, which certainly is the most important aspect in the entrepreneurial decision, the influence of the regulatory framework can be studied where it is critical, namely for individuals who are indifferent regarding their entrepreneurial decision.

Formally, the entrepreneurial decision can be described as a gamble in which the entrepreneur receives a payoff $\pi = \pi^*$ when the venture is successful and a payoff $\pi = 0$ otherwise (see Figure 3). A rational agent starts the business when the critical probability of success ϕ^* is such that the utility derived from the expected return exceeds the utility of the present income. The probability ϕ^* is determined by personal and social factors, the quality of the business idea, and, to a certain extent, by the possibilities and constraints that the regulatory environment provides.

The probability that individual i chooses to start a new business ($y_i = 1$) is specified using a logit model,

$$P(y_i = 1) = p_{i1} = \frac{e^{\mathbf{z}'_i \boldsymbol{\gamma} + \mathbf{x}'_i \boldsymbol{\beta}}}{1 + e^{\mathbf{z}'_i \boldsymbol{\gamma} + \mathbf{x}'_i \boldsymbol{\beta}}}, \quad (1)$$

where \mathbf{z}_i comprises a constant and a vector of personal characteristics (see Section 4.1)

and \mathbf{x}_i contains variables that describe the economic and regulatory environment. The vector \mathbf{x} varies across countries and years and is identical for all individuals who are observed at the respective time and place. Note that, since the level of regulation is precisely what is of interest, dummy variables for countries and years are not included in \mathbf{x} . Instead, the strategy of this paper is to pool all observations across countries and years and to consider all individuals against their respective backgrounds. That is, all value combinations of the regulatory variables that are recorded across countries and years are contrasted against a representative sample of individuals which was subject to those regulations and conditions. A detailed description of the economic data is given in the appendix.

Regulations, in general, may influence people’s entrepreneurial decisions via various transmission channels. As will be outlined in Section 4.2, the magnitude or even direction of these effects can be different for different groups of individuals. Yet, for this reason, the analysis of the effect of regulation on entrepreneurship is largely an empirical question and, consequently, the nature of this analysis is reduced form. That is, the estimated coefficients cannot be interpreted as parameters of a structural model nor do they describe how a certain variable affects *each* individual’s decision. Rather the estimated coefficients indicate by how much the odds ratio responds to changes in the regressors. The logarithm of the relative likelihood of observing entrepreneurial activity in an economy is given as

$$\ln \frac{P(y_i = 1)}{1 - P(y_i = 1)} = \mathbf{z}'\boldsymbol{\gamma} + \mathbf{x}'\boldsymbol{\beta} . \quad (2)$$

This interpretation of the coefficients is predictive in the sense that out-of-sample projections are made. Accordingly, this means that the representativeness of the sample is crucial and that the observation weights, which are delivered by the GEM, cannot be neglected.

4.1 Personal Characteristics

The literature about the personal characteristics that make an entrepreneur is extensive. In the classical perspective the skills and talents of individuals and low degrees of risk aversion are the essential factors (Lucas, 1978; Khilstrom and Laffont, 1979). This view is challenged by Djankov et al. (2008) who find that social networks and family background have the strongest influence on becoming an entrepreneur. However, all these characteristics are either unobservable² or do not account for the fact that each entrepreneurial undertaking is developed in a personal context and that these

²The GEM do provide self-reported data about skills, opportunities, network embeddedness, and risk aversion of individuals, but these variables must be considered highly endogenous with regard to the entrepreneurial decision and the underlying questions are not much to the point.

contexts can neither be observed nor compared across individuals. In fact, as argued by Koellinger et al. (2007) and Davidsson (1989, 2006) the subjective motivation is the distinctive feature of each entrepreneur and this motivation represents a compound of all circumstances that are relevant for the decision. Social and personal characteristics as well as the quality of the business idea influence this judgement and thus determine the willingness to become an entrepreneur. Thus, when the personal assessment of the situation can be controlled for all other personal, social, and environmental factors are captured.

In the following the variable $\ln Exp$ is introduced which is designed to measure the subjective element in the entrepreneurial decision. In the GEM survey, respondents who indicate to be involved in a business activity are asked how many employees they have at present and how many employees they expect to have in five years time. Expectations (Exp) are defined as the difference between the projected and the current number. For individuals who do indicate a projection but no current number expectations are set equal to the projection, assuming that the business is in the start-up phase and does not have employees yet. For non-entrepreneurs and entrepreneurs unable to indicate a projection expectations is set to zero.

A number of individuals state negative expectations -often when managing existing firms - and yet indicate to be in the process of starting a new business. The decline of a business, however, can be an incentive to start a new business, especially for entrepreneurially inclined individuals. Furthermore, a reduction of the number of employees can also be the consequence of a restructuring process or an attempt to free resources for new projects. And negative expectations can also be the consequence of high entrepreneurial activity in the past or it can show that even short-living projects are undertaken and not left lying idle. At the same time it has to be taken into account that total entrepreneurial activity is an activity measure and not the propensity to start a new business. Therefore, Expectations is defined in absolute values.

Furthermore, because of the enormous range of the variable all positive observations were raised by one and taken in logarithms. For computational reasons observations with $Exp = 0$ were assumed to be randomly distributed around zero. The variable is thus defined as

$$\ln Exp = \begin{cases} \ln(1 - Exp) & \text{if } Exp < 0, \\ \mathcal{N}(0, 0.001) & \text{if } Exp = 0 \vee y = 0 \\ \ln(1 + Exp) & \text{if } Exp > 0. \end{cases}$$

It is argued that $\ln Exp$ is the leading explanatory variable as it mirrors the optimism of the entrepreneur, which in turn condenses all other personal, subjective and social factors as well as the quality of the business idea that may be the true reasons for the decision. This way, the inclusion of $\ln Exp$ makes the marginal effect of regulation

observable. Additional personal variables included in the regression are age and a second order age polynomial, gender, work status, educational achievement, and the involvement in a family business. These variable can have an influence on the decision when the expectations are close to zero.

It is emphasized that the expectations variable does not describe the innovativeness of an entrepreneurial activity. Rather it depicts the expected dynamics of the enterprize. These dynamics are connected to enterprize growth, but not necessarily to innovation. In fact, a dynamic entrepreneurial environment may be conducive for innovation and growth but it is not a sufficient condition.

4.2 Opportunity and Necessity Entrepreneurship

For individuals who are entrepreneurially active the GEM data allow to distinguish between entrepreneurs who pursue a perceived business opportunity and those who start a business because no other work option was available. This distinction is interesting from a behavioral point of view, since it can be assumed that the two types respond differently to their regulatory environment. Beyond that, for our purpose this distinction allows to highlight possible transmission channels of the regulatory measures. Therefore, the second part of the analysis examines whether regulatory conditions affect opportunity and necessity entrepreneurship unequally.

Since the opportunity-necessity situation is only observable for entrepreneurs³ the behavior of the different types cannot be analyzed in separate regressions, because treating one of the types as non-entrepreneur would distort the randomness of the sample. The use of interaction terms between types and regulatory variables, which could also model the behavioral aspect, is not possible for reasons of collinearity. Therefore, a multinomial approach is chosen to assess the specific regulatory effects.

Multinomial logit models are mostly used in consumer choice analysis where the multinomial outcomes $j \in [0, J]$ represent different choice possibilities. The probability that an individual i chooses the alternative j is given as

$$P(y_i = j) = \frac{e^{V_{ij}}}{1 + \sum_{k=1}^J e^{V_{ik}}} \quad (3)$$

where V_{ij} represents the deterministic part of the individual's utility function. Since for each individual the chosen alternative j is observed one can also interpret this as individual i being of type j . The present application uses this interpretation in the way that j does not describe different outcomes but different types of decision makers. Yet, formally, this is equivalent with the right hand side of (3) defined as $V_{ij} = \mathbf{z}'_i \boldsymbol{\gamma}_j + \mathbf{x}'_i \boldsymbol{\beta}_j$.

³The unobservability for non-entrepreneurs may be an intrinsic feature of the data generating process as the question may be considered irrelevant by many respondents.

The respective terms indicate the probability that an individual of type j chooses to become self-employed but also the probability that an entrepreneur of type j is observed in the economy. The type-specific coefficients reflect that the different types may react differently under given conditions. Non-entrepreneurs are chosen as the base category $j = 0$ for which the coefficients are normalized to zero. The independence of irrelevant alternatives is satisfied by construction as the individual cannot choose between $j = 1$ and $j = 2$. As this model is an extension of the binomial model presented above the interpretation of the coefficients is analogical. A hypothetical change of one of the regressors changes the likelihood of type j entrepreneurship relative to non-entrepreneurship by

$$\ln \frac{p_j}{p_0} = \mathbf{z}'\boldsymbol{\gamma}_j + \mathbf{x}'\boldsymbol{\beta}_j . \quad (4)$$

5 Results

The estimation results are shown in Table 1. The first two columns show how total entrepreneurial activity relates to regulatory conditions. The last four columns give the multinomial estimates where opportunity and necessity entrepreneurs are distinguished. This distinction is useful to highlight potential transmission channels of the regulatory measures. The coefficients of the personal characteristics show that the majority of entrepreneurs are male, that working people are more likely to be involved in an entrepreneurial activity, and that, statistically, entrepreneurs are more formally educated than the rest of the population. It can further be seen that the expectations of individuals and their involvement in family business activities are effectively controlled for. The cultural environment for entrepreneurship is reflected in the results even though it remains insignificant. People who perceive an entrepreneurial opportunity realize it irrespective of the national attitude towards entrepreneurship, yet others who have trouble finding employment are more likely to resort to entrepreneurship if it is culturally common. In addition, it seems plausible that the activity of necessity entrepreneurs is more affected by the business cycle. The variable family business is not included in the multinomial regression as no necessity entrepreneur belongs to that category.

Five regulation variables exhibit statistically significant effects on total entrepreneurial activity. The result for the variable Start-up incentives show that countries with high efforts in labor market policies that are designed to encourage start-up activities have a significantly higher relative likelihood to create entrepreneurship as compared to countries with lesser efforts. Strong negative effects are found regarding administrative burdens for the creation of firms, direct government control of business activities, and minimum wage legislation. A significant positive effect is also found for exemptions

	Logit		Multinomial Logit			
	Overall		Opportunity		Necessity	
Variable	Coeff.	(se)	Coeff.	(se)	Coeff.	(se)
Age	0.119**	(0.017)	0.109**	(0.018)	0.168**	(0.030)
Age ²	-0.001**	(0.000)	-0.001**	(0.000)	-0.002**	(0.000)
Gender	-0.440**	(0.052)	-0.418**	(0.055)	-0.554**	(0.098)
Work	-0.823**	(0.071)	-0.886**	(0.077)	-0.579**	(0.101)
Educ	0.067*	(0.033)	0.120**	(0.035)	-0.208**	(0.059)
Family-bus.	2.125**	(0.573)	—	—	—	—
ln(Exp)	17.633**	(1.347)	17.638**	(1.325)	17.432**	(1.324)
Intercept	-4.356**	(1.035)	-2.992**	(0.922)	-2.717†	(1.513)
Growth	0.076	(0.055)	0.068	(0.058)	0.167†	(0.095)
Culture	0.056	(0.208)	0.163	(0.216)	-0.301	(0.404)
Start-up incentives	15.334**	(4.437)	12.903**	(4.669)	22.102**	(6.884)
Dismissals	0.128	(0.224)	0.166	(0.234)	0.007	(0.397)
Minimum wage	-5.246*	(2.081)	-2.170	(2.180)	-16.435**	(3.576)
Work agencies	0.123	(0.194)	0.306	(0.206)	-0.642†	(0.334)
Fixed-term contr.	0.242	(0.273)	-0.026	(0.288)	1.108*	(0.456)
Replacement ratio	-0.015	(0.009)	-0.011	(0.010)	-0.028	(0.018)
State control	-0.406**	(0.157)	-0.539**	(0.166)	0.334	(0.293)
Admin. burden	-0.755**	(0.288)	-0.518†	(0.300)	-1.679**	(0.505)
Comp. barriers	0.634	(0.401)	0.122	(0.424)	2.485**	(0.678)
Antitrust	0.310*	(0.151)	0.290†	(0.158)	0.436	(0.269)
Licensing system	-0.052	(0.078)	-0.090	(0.082)	0.023	(0.132)
Simplification	0.236	(0.366)	0.120	(0.382)	0.535	(0.633)
Small bus. tax	0.025	(0.027)	0.005	(0.028)	0.121*	(0.051)
N	87085		87085			
$\chi^2_{(42)} / \chi^2_{(22)}$	1132.79		934.802			

Table 1: The first two columns show how total entrepreneurial activity relates to regulatory conditions. The last four columns show the respective effects on opportunity and necessity entrepreneurship.

from antitrust legislation.

In the following the effects of each regulatory variable on the different types of entrepreneurship are discussed and potential transmission channels are described. It is found that start-up incentives for people who are struggling to find employment are well received by the target group. Opportunity entrepreneurs also profit from active labor market policies but to a far lesser extent. No effect is found for the restrictiveness of the rules of dismissals. In contrast, minimum wage legislation is found to strongly discourage business ventures that arise from necessity while opportunity entrepreneurs are hardly affected. This could reflect that venture that pursue a business opportunity are likely to be more profitable and to require higher skilled labor than necessity-driven ventures. Moreover, a high minimum wage reduces the incentive to become self-employed. The permissibility of employment through work agencies only slightly affects necessity entrepreneurship. The restrictiveness of regulations in fixed-term employment, however, is found to have strong positive effect on necessity start-ups. This result could indicate that a substitution from fixed-term employment into necessity entrepreneurship takes place if fixed-term employment is restricted. The benefit replacement ratio has no influence on the relative likelihood of entrepreneurial activity.

In the product market, opportunity entrepreneurs are most affected by the direct state control via, for example, price controls or the regulation of shop opening hours. This finding suggests that such direct involvements destroy opportunities yet leaves necessity entrepreneurship unaffected. Administrative burdens on start-ups also have a strong negative effect on opportunity entrepreneurs but even more so on necessity entrepreneurs. A strong positive effect on necessity entrepreneurship is found for regulations about the number of competitors in different markets of the economy. Similarly, exemptions from antitrust regulation have a positive effect on opportunity entrepreneurs. These findings are difficult to explain at present. The coefficients for the licensing system and the simplification of regulations are insignificant across types. Finally, the level of taxation of small businesses does not affect opportunity entrepreneurs but encourages necessity entrepreneurship. This effect may be of a competitive nature.

6 Remarks

The presented method is novel in that it allows a multivariate analysis of the marginal effect of regulation on entrepreneurship. The marginal effect becomes observable because the personal circumstances of entrepreneurs are controlled for. In particular, the personal assessment of the quality of the business idea is taken into account which is

in line with the theories of entrepreneurship that emphasize subjectivity.

The presented results suggest that active labor market policies do have a positive marginal effect on entrepreneurship while state control, administrative burden, and a high minimum wage are detrimental to total entrepreneurial activity. The regulations have different effects on opportunity and necessity entrepreneurship. For example, minimum wage legislation has a deterring effect on necessity entrepreneurs while opportunity entrepreneurs are hardly affected. These findings were scrutinized in several robustness tests and are robust to the inclusion, exclusion or substitution of regressors. At present, however, the results are not reproducible in the sample of countries without minimum wage legislation, which is probably owed to the smaller sample size of these countries. The sample will be enlarged so as to include observations from 2004 and 2005 so that a more complete picture is obtained. Moreover, further regulation variables, particularly from the taxation environment will be included.

The above analysis can be extended to measure the effect of regulation on innovation through entrepreneurship as the GEM provide data about the the industry sector where the market entry occurs and the degree of market expansion. This, however, is left for further research.

Appendix

Labor Market

Dismissals measures the complicatedness of dismissals, the definition of unfair dismissal, the length of regular trial periods, prescribed compensations for dismissed employees, and regulations on reinstatement.

Fixed.Term measures valid cases for the use of fixed-term contracts, the maximum number of successive contracts, and the maximum cumulated duration of temporary work relationships.

Work.Agencies measures restrictions on the types of work for which employment through work agencies is legal, on the number of contract renewals, and on the maximum cumulated duration employment through agencies.

Min.Wage: Ratio of the legal minimum wage and the median wage of a fully employed worker.

Product Market

Administrative burden measures the number of procedures an entrepreneur has to undergo to register a new business, the number of bodies to contact, and the cost of registration.

Simplification measures whether administrative rules are actively communicated by the authorities and whether attempts are made to simplify them.

Licensing measures whether licences are issued automatically the difficulty to obtain information about licences and permits for new businesses.

Competition measures whether the number of competitors in specific markets of the economy is legally restricted.

State Control measures direct intervention into business operations by the authorities, for instance via price controls or the regulation of shop opening hours.

Antitrust measures whether antitrust exemptions are in place.

Other legislation

Replacement: Percentage of the salary that is covered by social welfare when a

person becomes unemployed; averaged over two earnings levels, three family situations and three durations of unemployment.

Incentives: Public expenditure as percentage of GDP directed to start-up incentives for unemployed and other target groups. Assistance can take the form of direct cash benefits or indirect support including loans, provision of facilities, business advice, etc.

Taxation: Corporate tax rate with all possible exceptions for small businesses included.

Economic Environment

Growth: Year-on-year growth rate of GDP.

Culture: Cultural acceptance of entrepreneurship. It is based on the 2000 GEM experts survey. Culture is the average of the indicators to the following questions. In my country, the creation of new ventures is considered an appropriate way to become rich; most people consider becoming an entrepreneur as a desirable career choice; successful entrepreneurs have a high level of status and respect; you will often see stories in the public media about successful entrepreneurs.

Personal Characteristics

Work: Respondent's employment in three categories. 1: works at least part time; 2: doesn't work; 3: retired.

Education: Respondent's educational attainment in five categories. 1: less than no secondary education; 2: some secondary education; 3: completed secondary education; 4: post-secondary education; 5: graduate expert.

Gender: 1: male; 2: female;

Age: Only observations between 18 and 64 are taken into account.

	Dismissals	Fixed-term	Agencies
Dismissals	1.00		
Fixed-term	0.58	1.00	
Work agencies	0.57	0.55	1.00

Table 2: Correlations : Labor Market

	Admin.	State	Lic.	Simp.	Comp.	Antitr.
Admin. burden	1.00					
State control	0.66	1.00				
Licensing system	-0.13	-0.12	1.00			
Simplification	0.52	0.35	-0.28	1.00		
Comp. barriers	0.21	0.09	-0.02	-0.13	1.00	
Antitrust	-0.18	-0.41	-0.15	-0.02	0.02	1.00

Table 3: Correlations : Product Market

	Growth	Culture	Min.Wage	Repl.	Incent.
Growth	1.00				
Culture	0.03	1.00			
Min.Wage	-0.27	-0.52	1.00		
Replacement	-0.43	0.05	0.00	1.00	
Incentives	0.41	-0.05	-0.23	0.11	1.00

Table 4: Correlations : General Variables

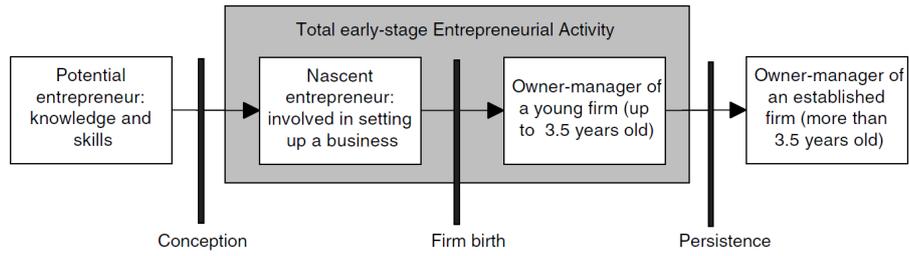


Figure 1: Entrepreneurship is considered as a process and not as an event. The total entrepreneurial activity rate is defined as the percentage of the population who is engaged in any of the early stage activities. Graphic from Reynolds et al. (2005)

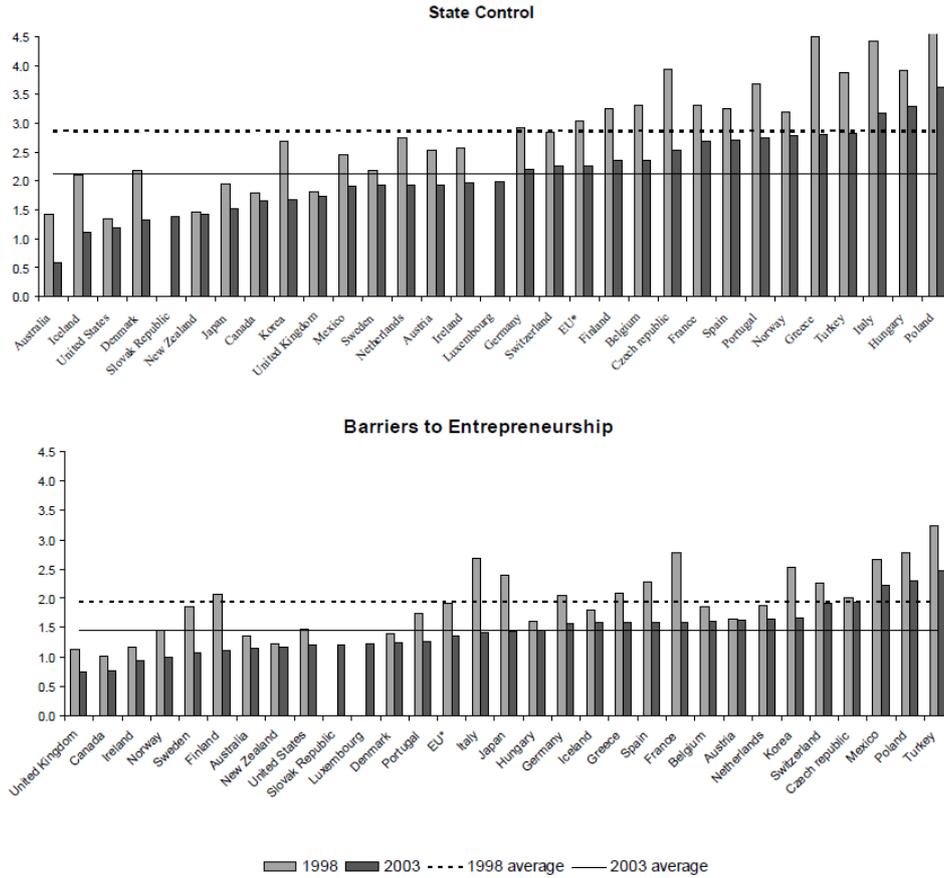


Figure 2: Indicators measure the restrictiveness of regulation in different policy area (two examples are shown). High values indicate a restrictive environment. Cross-country comparisons that are conducted on a standardized basis allow to benchmark the regulations in their conduciveness for on entrepreneurship when the overall effect of the regulation on entrepreneurship is known. Graphic from Conway et al. (2005)

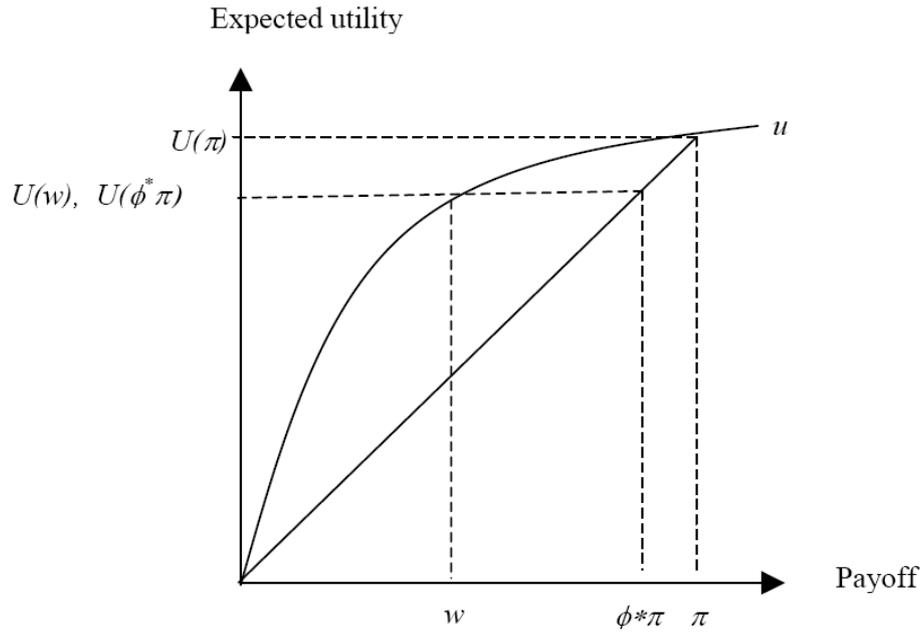


Figure 3: The entrepreneurial decision can be modeled as gamble in which the entrepreneur receives a payoff $\pi = \pi^*$ when the venture is successful and a payoff $\pi = 0$ otherwise (see Figure). A rational agent starts the business when the critical probability of success ϕ^* is such that the utility derived from the expected return exceeds the utility of the present income. The probability ϕ^* is determined among other things by the possibilities and constraints that the regulatory environment provides. Graphic from Acs et al. (2004)

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