

Is the entrepreneurship rate in Germany negatively affected by labor market regulations?

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Abstract

Many studies provide convincing evidence that highly educated individuals, particularly academics, most successfully start up businesses. Survival rates are higher, growth is faster, and innovation more widespread. However, many talented people do not even consider starting a business, but rather restrict their occupational choice on being an employee. We argue that this reluctance is due to a systematically distorted occupational choice decision. We develop a model of becoming an entrepreneur based on prospect theory, and test its implications with a rich data set covering 5,000 students in and around Cologne, Germany. We regress the willingness to become an entrepreneur on an individual's entrepreneurial competence, institutional knowledge (particularly about labor market flexibility or restrictions), and risk aversion. Our empirical results confirm firstly that individual perception can be explained by institutional knowledge and secondly individual perception determines the affinity to become an entrepreneur. Thereby, a lower probability to become an entrepreneur is determined by a low level of institutional knowledge rather than unfavorable facts within the institutional environment. Thus, academic education aiming to increase entrepreneurship should not only concentrate on analytical tools but have a strong emphasis on institutional details, too. At the same time, less skeptical media coverage on institutional constraints and hurdles might as well boost entrepreneurship because it fosters positive perception.

JEL Classification: M13, J24, M59

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1 INTRODUCTION

Birch (1987: 1979) and many follow-up studies (Zacharakis/Neck/Bygrave/Cox 2002; Reynolds/Miller/Maki 1995) provide convincing evidence that newly founded companies create more jobs and economic growth than established and big companies. Among the most successful are highly educated entrepreneurs, particularly academics. Survival rates are higher, growth is faster and innovation more widespread (Davidsson/Honig 2003; Moog/Backes-Gellner 2003). However, many talented people do not even consider starting a business, but rather restrict their occupational choice on being an employee. Explanations based on traditional microeconomic theory argue that regulations in general hinder a market efficient solution for start-ups (for market entry) (OECD 1999) because they reduce entrepreneurial flexibility. For Germany, particularly labor market regulations concerning hiring and firing, overtime and short time work, etc. are supposed to have this effect. Academic start-ups as growing companies and often with personnel intensive production are supposedly hindered to grow due to excessive costs of employing and laying off new employees due to a lack of flexibility. Since there are many restrictions to layoffs in Germany it is argued that it is too difficult and expensive for a start-up company to layoff employees in case of economic downturns. Therefore, they not even consider hiring new employees. Furthermore, if new labor market entrants like academics know about such problems with labor market regulations, they are not willing to start a business. In contrast, it is argued that labor market regulations may help to diminish the effects of market failures and externalities and may therefore be a valuable asset for human resources management (Backes-Gellner/Frick/Sadowski 1995), even for or particularly for start-up companies. The consequences of labor market regulations on start-ups are not determined yet (Freeman/Kleiner 1999).

With our study we go even beyond this rather old discussion and argue that the reluctance of academics to start a business is due to a systematically distorted occupational choice decision. We assume that the individual perception of the relevant regulations for a start-up – irrespective whether this perception matches with real regulations – will have its own, direct impact on the individual's occupational choice decision. We argue that especially the gap between perceived and real regulations concerning institutional flexibility has a strong impact on occupational choice. Therefore, a perception of limited freedom of action for human resources decisions has a significant influence on the willingness to become self-employed.

We assume that the effect is particularly strong for one-men (sole proprietors) and small businesses, because this is most likely the situation when subjective evaluations of the owner are decisive. The owner or potential owner use their subjective evaluation of labor market regulations to calculate potential personnel costs resulting from labor market regulations and its perceived inflexibility. An anticipation of inflexibility leads to an anticipation of lower profits and personal income for the potential founder, which in turn affects his occupational choice in a very early stage. So, in accordance with standard economic theory we assume that expected income plays an important role in occupational choice, but in deviation to standard reasoning we argue the alternative to become self-employed is not only determined by factual labor market regulations but is severely distorted by the *perception* of labor market regulations.

A second deviation from standard economic reasoning is that we do not assume risk neutrality for entrepreneurs. Traditionally, an entrepreneur is seen as risk neutral, which means he is indifferent to income volatility. In our second model, entrepreneurs may as well be risk averse. So, we analyze the impact of different degrees on risk aversion on the probability to become an entrepreneur.

In a third model, we challenge a second assumption of traditional economic entrepreneurship theory, i.e. we no longer assume fully rational decision making in occupational choice. So far, traditional economic entrepreneurship research uses expected utility theory (EUT) with fully rational decision makers¹. However, there is a vast amount of literature with increasingly convincing evidence for bounded rationality in decision making (e.g.: Goette/Huffman/Fehr 2004; Felten 2002; Shleifer 2000; Gigerenzer/Todd 1999; Selten 1990). The traditional EUT ignores limited knowledge, time restrictions and emotions in decision making. We argue, that taking into account individual perceptions of risk and reference points as a means to evaluate the outcome of a decision, is an important development to explain occupational choice of potential employees/entrepreneurs. Therefore, we use prospect theory to explain the probability to become an entrepreneur (see originally Kahneman/Tversky 1979). According to Kahnemann/Tversky we consider firstly, subjective probability weighting depending on individual knowledge and secondly, that individuals evaluate gains and losses subject to a reference point.² Based on these assumptions we will analyze the effect of entrepreneurial competence and the effect of individual income reference points on the probability to become an entrepreneur.

The paper is structured as follows. In chapter 2.1 we present a basic decision tree of the occupational choice decision of a labor market entrant. In the following three chapters we present firstly, a simple rational choice model with a risk neutral potential entrepreneur, secondly with a risk avers decision maker, and thirdly, a prospect theoretical model with decision-makers with bounded rationality. In chapter 3 we specify three alternative empirical models to test the theoretical implications with a rich data set covering more than 5,000 students in and around Cologne, Germany. Finally, we summarize our results and draw first conclusions for entrepreneurship theory and policy.

2 OCCUPATIONAL CHOICE AND THE PERCEPTION OF LABOR MARKET FLEXIBILITY

2.1 The model - basic assumptions

In the next section we assume that every individual has the choice to become self-employed or not $\{s,e\}$, with s determining the occupational status of being self-employed and e working as an employee (cf. figure 1). There are two types of decision maker j : one who perceives labor market regulations to be flexible (*type f*) and the other who perceives them to be inflexible (*type i*). So, *type f* assumes that labor market regulations are not hindering efficient employment adjustments, whereas *type i* anticipates restrictions to employment adjustments. Entrepreneurs of the latter type expect limited flexibility when running their business employees of *type i* expect lower fluctuation and thus stable employment relations. Expected incomes of both decision makers as either entrepreneur or employee are given in figure 1.

Figure 1 about here

When labor market entrants decide on their occupational choice, wages of future employees are assumed to be known and fixed at a certain level. In contrast, entrepreneurial income is assumed

¹ Following von Neumann/Morgenstern (1947) or Savage (1954).

² People tend to evaluate outcomes as gains and losses relative to a reference point (Moore/Cain 2004).

to vary substantially. The distribution of entrepreneurial income S is assumed to be known. Standard deviation or range may reach quite high levels. However, to keep matters simple, we assume a symmetric distribution.³ Entrepreneurial income is determined by developments in the respective market. Here we distinguish between three situations:

a) Steady state. In this scenario the market develops steadily along a stable trend. An entrepreneur can easily foresee the labor volume at any given time he or she will recruit the number of employees that is needed for an efficient production and there will be no need to adjust staffing plans. Entrepreneurial income that is generated under this scenario is s_j^b .

b) Market underperformance due to not predictable future events. Those events lead to a diminishing demand and the need to downsize. This market situation will lead to a lower entrepreneurial income s_j^a , which is assumed to be even lower than employee income w .

c) Market overperformance. Demand booms far more than expectable and labor volume is much higher than planned. An entrepreneur can either hire additional personnel or have people work overtime, but very likely at additional cost. Overperforming markets are in general assumed to lead to higher entrepreneurial income s_j^c , although profit might not increase as much as sales due to excessive expansion costs resulting from inflexible institutional arrangements. However, we assume entrepreneurial income in overperforming markets always to be higher than in stable or underperforming markets. So, $s_j^a < w_j < s_j^c$.

Entrepreneurial profit or income is sales minus cost. So, depending on labor intensity of production, entrepreneurial income is more or less influenced by employment costs. Producing at suboptimal employment levels diminishes entrepreneurial income.

If markets perform worse than expected (case a), it is in the entrepreneurs' interest to reduce their employment level instantly. If this is not possible or at high adjustment costs only, profits are negatively affected. Therefore, *type i* entrepreneurs expect lower flexibility and higher adjustment costs than *type f* entrepreneurs. Accordingly, *type i* entrepreneurs anticipate lower entrepreneurial income than *type f* entrepreneurs due to suboptimal employment levels or high adjustment costs, so $s_f^a > s_i^a$.

In contrast, in a stable market situation (case b), the entrepreneur has no need to deviate from his planned employment levels. So both kinds of decision makers, *type f* and *type i*, expect similar costs because there are no unforeseeable adjustment costs. Therefore, entrepreneurial income is assumed to be identical: so $s_f^b = s_i^b$.

If markets perform better than expected (case c), entrepreneurs need to increase their employment level more than planned. In such a situation *type i* entrepreneurs will hire employees more carefully or more slowly than *type f* entrepreneurs because of their perception of inflexible labor market regulations: *Type i* entrepreneurs fear the costs of having to lay off those employees in case markets adjust downwards again. Therefore, *type i* may temporarily produce below the optimal employment level, for example by using overtime with overtime premia in order to produce on a higher level. In contrast, *type f* entrepreneurs will adjust their employment level instantly to any market situation. Therefore, they always work at an optimal employment level

³ We thereby ignore studies that give reasons to assume that entrepreneurial income is not symmetric. Lazear (2004) e.g. concludes that entrepreneurial income should be skewed.

and thereby expect to generate higher profits (and entrepreneurial income) than *type i* entrepreneurs. So $s_f^c > s_i^c$.

On top of the aforementioned effects, the perception of labor market regulations and particularly the flexibility to adjust employment levels also exerts an effect on the expected income of the different types of employees w_f and w_i . On one side, *Type i* assumes a stable employer-employee relation due to his perception of strong labor market regulations and low flexibility. Therefore, employee income w_i is considered to be riskless. On the other side, *type f* anticipates frequent layoffs and fluctuation. Therefore, *type f* employees do not consider income to be fully downward rigid, which leads to lower expected incomes for *type f* than for *type i*. So: $w_f < w_i$. Now we analyze how these assumptions on income etc. affect a risk neutral decision maker.

2.2 Risk neutral decision makers: perceptions of labor regulations and their impact on occupational choice

A risk neutral individual decides on his occupational choice based on expected income $E(s_j)$. Expected entrepreneurial income is $E(s_j) = qs_j^a + ps_j^b + qs_j^c$. Expected employee income is w_j . So the decision to become entrepreneur or employee is taken according to the following rule:

If $qs_j^a + ps_j^b + qs_j^c < w_j$ with $j \in \{i, f\}$ the individual decides to become employee.

If $qs_j^a + ps_j^b + qs_j^c \geq w_j$ with $j \in \{i, f\}$ the individual decides to become entrepreneur.

If expected entrepreneurial income is higher than expected employee income, an individual prefers to be self-employed. If we apply this decision rule to the two different types of individuals *i* and *f*, we obtain the following results for occupational choice.

If we compare decisions of *type f* and *type i*, we see that a decision maker of *type f* who perceives labor market regulations to be more flexible, is more likely to become self-employed for two reasons: Firstly, in case of an under- or outperforming market, anticipated entrepreneurial income of *type f* is higher, i.e. $E(s_f) > E(s_i)$. Secondly, *type f* as an employee anticipates higher fluctuations than *type i*, so expected employee income of *type f* is lower wage than expected income of *type i*, i.e. $w_f < w_i$. Both effects result in a higher probability of *f type* decision makers to become entrepreneurs. So we obtain a first hypothesis.

Hypothesis 1:

Individuals who perceive labor market regulations to be restrictive have a lower probability to become self-employed than individuals who perceive labor market regulations to be flexible.

So, whenever costs of obtaining full information on labor regulations are high (e.g. due to a large number of a vast variety of regulations) entrepreneurship rates are low independent of de jure and de facto flexibility. It's perceptions that matter.

2.3 Risk avers decision makers: entrepreneurs as innovators rather than risk takers

In a second step, differences of the decision maker in the attitude towards risk are integrated in our model. In standard economic theory employees are assumed to be risk avers and entrepreneurs to be risk neutral. We assume that even entrepreneurs may be risk averse. From Knight's point of view the constitutional characteristic of an entrepreneur is to take and to deal with risk generated by capital restrictions. So the entrepreneur is assumed to be risk neutral.

However, Schumpeter separates the entrepreneur (identifying opportunities to barter, trade, or innovate) from the individual(s) supplying capital; the first is generating innovation etc, the latter is taking the financial risk. Accordingly, the entrepreneur may as well be risk averse and can still run a business.

To analyze the effect of risk aversion on occupational choice, we have to deal with the expected utility of an individual. We compare the decision situation of a risk neutral and a risk averse individual. The general rule of occupational choice can then be modeled as follows:

$$EU(s_j) = qu_r(s_j^a) + pu_r(s_j^b) + qu_r(s_j^c) \geq u_r(w_j) \implies \text{entrepreneur}$$

$$EU(s_j) = qu_r(s_j^a) + pu_r(s_j^b) + qu_r(s_j^c) < u_r(w_j) \implies \text{employee} \quad \text{with } j \in \{i, f\}$$

u_r is a Bernoulli utility function with a constant, absolute degree of risk aversion with $u_r' > 0, u_r'' < 0$. Since being self-employed is associated with substantial risk (associated with situations a to c), a risk averse decision maker expects a positive risk premium if he is to become an entrepreneur. The risk premium increases the more risk averse the individual is.

Hypothesis 2: The higher is the degree of risk aversion, the lower is the probability of becoming an entrepreneur.

At the same time it can be shown that the general pattern of hypothesis 1 does not change. *Type f* individuals are more likely to become entrepreneurs than *type i* individuals. But the decision of *type i* individuals is more heavily influenced by the degree of risk aversion than decisions of *type f*. This results out of two aspects: a) *Type i* expects a lower entrepreneurial income and a higher wage than *type f*. b) The variance of the expected entrepreneurial income is higher for *type i*.

2.4 Decision-makers and bounded rationality: occupational choice and prospect theory

Based on prospect theory developed by Kahneman/Tversky (1979) we analyze the influence of systematic deviations from rational decision making on occupational choice. First, Kahneman/Tversky (1979) have provided extensive evidence of departures from the prediction of expected utility theory. Unlike EUT assumes, individuals' estimates of probabilities are systematically biased, i.e. they use an individual decision weight function. Second, individual's perceptions are attuned to the evaluation of changes rather than to the evaluation of absolute magnitudes. Previous experiences define a reference point. Decision outcomes are evaluated in relation to this reference point and decision-makers appear to be more adverse to losses, relative to their reference point, than attracted by gains of the same size (Kahneman/Tversky 1979).⁴

The *decision-weight function* g_γ is a transformation of the objective probabilities p and q . The function is monotonically increasing, with discontinuities at 0 and 1. It systematically overweighs small probabilities and underweighs large probabilities (Moore/Cain 2004). The extent to which objective probabilities are over- or underestimated is assumed to depend on the level of competence of the decision maker, which is specified with the following function.

$$g_\gamma(p) = \frac{p^\gamma}{(p^\gamma + (1-p)^\gamma)^{1/\gamma}} \quad \text{with } \gamma = f(\text{competence}), 0 < \gamma \leq 1.$$

⁴ The idea that the carriers of utility are changes of wealth rather than asset positions is a cornerstone of prospect theory (Kahneman/Tversky 1979).

The more competent a person is, the less distorted is the decision-weight function and the higher the level of *incompetence*, the higher is the bias in this function. Thereby, an individual's occupational choice decision is systematically distorted depending on his or her competence level. So, based on prospect theory we expect that the decision to become an entrepreneur is systematically distorted depending on the competence level γ of the decision maker. Occupational choice can thus be modelled as follows:

$$P(s_j) = g_\gamma(q)u(s_j^a) + g_\gamma(p)u(s_j^b) + g_\gamma(q)u_r(s_j^c) \geq (g_\gamma(q) + g_\gamma(p) + g_\gamma(q))u(w_j)$$

⇒ entrepreneur

$$P(s_j) = g_\gamma(q)u(s_j^a) + g_\gamma(p)u(s_j^b) + g_\gamma(q)u_r(s_j^c) < (g_\gamma(q) + g_\gamma(p) + g_\gamma(q))u(w_j)$$

⇒ employee

How does this affect the probability to become an entrepreneur given the above mentioned decision tree? According to our assumptions entrepreneurs are faced with a symmetric function of market situation. Steady market trends are most likely and over- or underperforming markets are less likely. So, the mass of the probability function is concentrated around a steady market development (s_j^b) which has a probability of p_b , which is higher than that of (s_j^a) and (s_j^c), so $p_b > p_a, p_c$. If individual competence is high, the individual's subjective probability distribution (g_γ) hardly differs from this objective probability distribution. In contrast, if an individual's competence is low, the subjective probability distribution is heavily distorted. According to the assumptions of prospect theory, small probabilities are overweighted, so the probability of (s_j^a) and (s_j^c) is overweighted. At the same time the remaining probability of a stable market development (s_j^b) is underweighted. An incompetent decision maker will weigh the smaller probabilities (q) of over- or underperforming markets higher than a competent decision maker. In contrast, he will underweigh the high probability (p) of stable market developments. The incompetent decision maker redistributes probability mass from the stable market situation to the over- or underperforming market situation. Thus, the incompetent decision maker "gains" by overweighting excess profits (dc), but at the same time he "loses" more by overweighting unexpected losses (da). As long as the utility function is concave, the "loss" due to incompetence da exceeds the "gain" due to incompetence dc .

To illustrate the effect on occupational choice we distinguish between two kinds of decision makers (cf. table 1): a perfectly competent decision maker who uses the objective probabilities to calculate his prospects, and an incompetent decision maker who weighs the probabilities with the function (g_γ).

Table 1 about here

Thus, an incompetent decision maker will always get lower prospects from being an entrepreneur than a competent one. This leads us to a third hypothesis regarding the probability to become an entrepreneur:

Hypothesis 3a: All else being equal, incompetent decision makers are less likely to become entrepreneurs than competent decision makers. The more competent a decision maker is, the higher is the probability to become an entrepreneur.

Secondly, the assumption that individuals evaluate risky prospects on the basis of changes relative to some reference point, they become risk averse towards gains and risk loving towards losses. They value large gains less than proportional and large losses less than proportional, which is in line with (experimental) evidence (Kahneman/Tversky 1979). So we introduce a reference point into our occupational choice model, assuming that previous income may be the reference point for occupational choice.

Hypothesis 3b: All else being equal, decision makers having higher previous income should be more likely to become an entrepreneur than decision makers with lower previous income (because the first ones value losses less severe).

3 DATA, MEASUREMENT ISSUES, METHOD AND EMPIRICAL RESULTS

We test our hypotheses with our own database (Cologne Founder Study⁵). It is a very rich data set, which was gathered to analyze the potential of academic start-ups. The dataset is a sample of students from five universities in the metropolitan area of Cologne. It contains of 3,806 students. The data were collected with a standardized questionnaire sent out by mail in 1998/99. The questionnaire includes more than 300 variables. For every student we have data about their perception of different labor market regulations and expected market conditions. Moreover, we have information on formal education and work experience (employed and self-employed), which partly determines their competence level. We have information on their willingness to become entrepreneur as opposed to becoming an employee. Furthermore, we have a big number of objective and subjective indicators concerning personal attitudes, like importance of job characteristics, valuation of entrepreneurs in society, or intention of studying.

Measurement of the dependent variable: probability of becoming an entrepreneur

The dependent variable we use is the “willingness of a student to become self-employed”. Since students usually have not finally taken their occupational decision while still studying, and therefore neither entrepreneur nor employee, we can only take their “willingness to become an entrepreneur”. However, as many empirical studies have shown, actual entrepreneurs are a subsample of the so called nascent entrepreneurs. So someone who never thought about becoming an entrepreneur is almost certain to become an employee, and someone who considers becoming an entrepreneur in an early stage of his occupational choice will become an entrepreneur with a positive non trivial probability (z.B. Franke/Lüthje 2002; König/Meder/Schulz 1999; Hinz 1999; Welter/von Rosenblatt 1998). So our results can be interpreted like an upper bound of the probability to become an entrepreneur.

Our dependent variable “willingness to become entrepreneur” is a discrete variable ranging from -4 (low willingness to become entrepreneur) to +4 (high willingness to become entrepreneur). It is calculated based on several likert scaled occupational preference items and therefore treated as

⁵ The students database is, next to another company database, part of a project supported by the German Research Foundation (DFG) in the context of “interdisciplinary start-up research”. We express our thanks to the Deutsche Ausgleichsbank (DtA), the Sparkasse Köln and the City of Cologne for their financial support. For more information about the project and the survey see Backes-Gellner/Demirer/Moog (2000).

quasi-metric (Peel/Goode/Moutinho 1998). As the distribution of the variable is also close to a normal distribution (table 2), we use OLS to test our empirical implications.

Table 2 about here

35 % of all students in all five universities have a strong interest in becoming an employee (-4 to -2). Only 17 % of the students have a strong willingness to become an entrepreneur (+2 to +4). Most of the students (46 %) are still more or less indifferent.

Measurement of independent variables

In the next section we specify three empirical models to analyze the willingness to become an entrepreneur. The three empirical models follow the three alternative theoretical assumptions and models given in chapter 2. The independent variables we use are driven by the variables discussed in the respective chapters and are summarized in table 3. In addition to the explanatory variables derived from our theoretical models, we use a number of standard control variables, such as gender, numbers of semester studied, faculty enrolled in, importance of ideas, importance of fame/reputation or the actual financial status.

This leads us to the following three empirical models.

Table 3 about here

Model 1:

Willingness to become an entrepreneur = $\beta_0 + \beta_1 flexlaw + \beta_2 flexreg + control\ variables + \varepsilon$

First, we test the influence of the perception of labor market regulations. We differentiate between the perceived (in)flexibility due to labor law (β_1) and the perceived (in)flexibility due to collective bargained regulations (β_2). The higher the coefficient is, the higher is perceived flexibility. So, according to hypothesis 1 we expect β_1 and β_2 to be positive, because a higher labor market flexibility should lead to a higher willingness to become an entrepreneur.

Model 2:

Willingness to become an entrepreneur =

$\beta_0 + \beta_1 flexlaw + \beta_2 flexreg + \beta_3 riskavers + \beta_4 promotion + control\ variables + \varepsilon$

Model 2 is an extension of model 1 and adds variables covering the degree of risk aversion of the decision maker. A first variable we use, is the importance of a foreseeable future income (β_3). We assume that a student is more risk averse, the more important it is for him or her, that his future income is foreseeable (not subject to irregular changes). So, we expect β_3 to be negative because the more risk averse a person is, the less likely he or she is to become an entrepreneur. A second variable we use is the importance of foreseeable promotions (β_4). Here we also expect a negative coefficient because again, the more important it is that the career is foreseeable, the higher is risk aversion and the lower is the probability to become an entrepreneur.

Model 3:

$$\text{Willingness to become an entrepreneur} = \beta_0 + \beta_1 \text{flexlaw} + \beta_2 \text{flexreg} + \beta_3 \text{riskavers} + \beta_4 \text{promotion} + \beta_5 \text{friend} + \beta_6 \text{parents} + \beta_7 \text{self-employed} + \beta_8 \text{freelancer} + \beta_9 \text{apprentice} + \beta_{10} \text{internship} + \beta_{11} \text{employee} + \beta_{12} \text{infointens} + \beta_{13} \text{actfinstat} + \text{control variables} + \varepsilon$$

In the third model, we include a set of variables to operationalize the competence level. In general we assume that people who have a broader information base have a higher competence level when forecasting potential market developments. Firstly, we use a set of variables about the *entrepreneurial spirit in the social surrounding* of a student, because we assume that students who are in contact with people who are entrepreneurs implicitly learn from them how to evaluate their market. We ask whether the student has a friend who started a business or whether their parents work as entrepreneurs. Secondly, we use variables representing a student's *work experience in an entrepreneurial context*. We ask whether they have any experience as an entrepreneur or whether they have been working as a freelancer, which is quite similar to being an entrepreneur. Thirdly, we use general work experience as an indicator for the level of *general business related competence*. Here we asked whether they ever went through an apprenticeship, worked as an intern or as an employee. We assume, if students have more experience in practical work and real business experience they have a higher competence level to assess potential opportunities as well as problems and market conditions in general. So, the more general the students work experience is, the higher is their willingness to become self-employed. A fourth variable to measure the competence level, is the intensity of economic information intake. We assume, the higher is the number of news-media students use for economic information, the higher their competence and thereby, the higher their willingness to become an entrepreneur. *Control variables*: In addition to the explanatory variables, we use a number of control variables which are common in occupational choice studies. These are e.g. the importance of realizing ones own ideas, dummy variables for field of study and sex, or number of years studied.

Table 4 summarizes the results of OLS regressions. Results for model 1 clearly indicate that entrepreneurship is determined by individual perception of labor market flexibility (labor law and collective agreements). Both variables are significantly positive, i.e. the higher is perceived flexibility, the higher is the willingness to become an entrepreneur. The perception of the (in)flexibility due to collective agreements has a stronger influence than that of labor law. The second model shows that the willingness to become entrepreneur is affected by an individual's degree of risk aversion. The higher the risk aversion the less pronounced is the willingness. The impact of foreseeable income is stronger than the importance of promotion. The two additional variables in the regression model do not lower the significance of the flexibility variables. So, the perception of labor market regulations remains significant. The fit of model 2 is better. This indicates that the degree of risk aversion is important for the entrepreneurial choice.

Table 4 about here

Model 3 provides mixed results. Firstly, entrepreneurial experience, general knowledge, work experience, and entrepreneurial competence in the social surrounding are positively correlated with the willingness to become an entrepreneur. Surprisingly, entrepreneurial parents have no significant effect. The intensity of economic information intake has a significant positive influence on start-up willingness. Students who use more news media to stay informed have a higher willingness to become entrepreneurs than students who are less well informed. Having

personally experienced being an entrepreneur in the past significantly increases the willingness in the future. Working as a freelancer has no effect, as well as having finished an apprenticeship. Looking at working experience as an employee, we find a significant negative effect on becoming an entrepreneur. However, the competence gained by participating in an internship significantly increases the willingness. This might be caused by the fact that internships are generally located in higher hierarchical level than students working as regular employees. The actual financial status as a reference point has the expected positive effect. The variables from model 1 and 2 remain important. The influence of the perception of flexibility of collective agreements becomes stronger, the perception of labor law becomes insignificant. The degree of risk aversion measured by importance of foreseeable income remains significantly negative. Overall, the use of our competence variables in the regression increases the fit of our model. It explains 32 % of the variance in the willingness to become an entrepreneur.

4 CONCLUSION

The aim of this paper was to analyze theoretically and empirically the decision to become an entrepreneur, and particularly to see whether prospect theory helps to better explain this occupational decision. We start with a traditional decision model of occupational choice, we then introduce varying degrees of risk aversion into our model, and finally we use the concept of weight probability distribution from prospect theory to explain occupational choice. Based on these models we expected the willingness to become entrepreneur to be higher if labor market regulations are perceived to be more flexible, if individual risk aversion is lower and if general entrepreneurial competence is higher and the reference income is higher. All implications are borne out in the data. Particularly, we find positive effects of a more positive perception of labor market flexibility (independent of real facts) and of a higher business and entrepreneurial competence level. Therefore, we firstly conclude that not only de jure or de facto regulations matter, but even more so media coverage of labor market flexibility. Public opinions driven by media affect individual perception of flexibility and thereby the willingness to think of becoming an entrepreneur. Due to bad news many students may be withheld from considering becoming an entrepreneur in a very early stage. Since individual perception of flexibility concerning regulations has one of the strongest impacts on occupational choice, media coverage on this subject is probably very important for the entrepreneurship rate in a country. Secondly, since we find that higher competence levels have a positive effect on the willingness to become entrepreneur, the amount at which real facts on labor market regulations and market developments is taught, might be important for the entrepreneurship rate. Higher competence of students to evaluate market opportunities and risks realistically is also a major factor increasing the willingness to start a business. So if a university wants to increase its entrepreneurship potential, teaching market competences by case studies, guest lecturers and business plan competitions are likely to increase the willingness to consider entrepreneurship as a realistic occupation alternative. As regards the explanatory strength of different theories, we find prospect theory to be very powerful since it introduces the degree of competence about a subject or decision area as an important variable. Competence determines the deviation of the individual decision-weight function from the objective probabilities and thereby the prospect of being self-employed strongly.

TABLES AND FIGURES

Figure 1: Decision tree of occupational choice

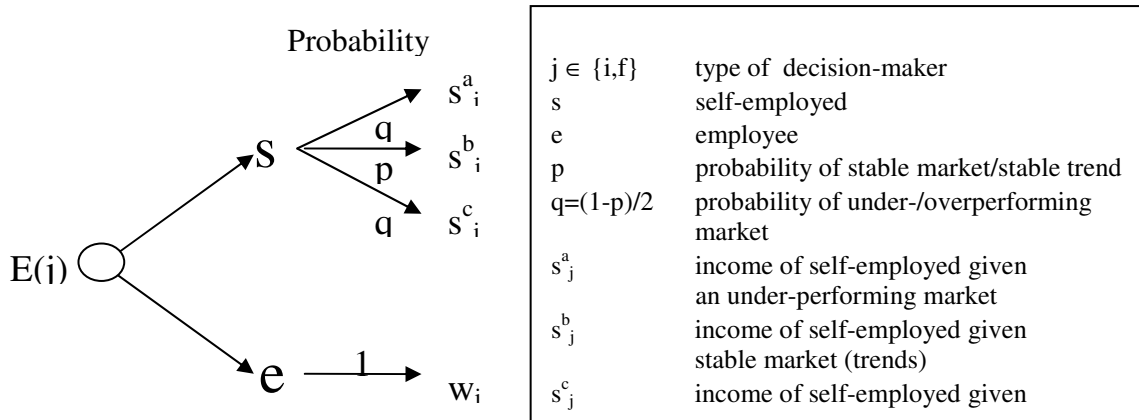


Table 1: Implications from prospect theory on occupational choice

Income	Competence $\gamma=1$	Incompetence $\gamma<1$	Change in prospects
s^a_j	Q	$g_\gamma q > q$	$[g_\gamma q - q]u(s^a_j) > 0$
s^b_j	P	$g_\gamma p < p$	$[g_\gamma p - p]u(s^b_j) < 0$
s^c_j	Q	$g_\gamma q > q$	$[g_\gamma q - q]u(s^c_j) > 0$

Table 2: Occupational preferences

Willingness to become entrepreneur	←-----→								
	low								High
	-4	-3	-2	-1	0	+1	+2	+3	+4
N of students	306	396	634	576	656	546	392	166	134
% of students	8	10	17	15	17	14	10	5	4

Table 3: Specification of the independent variables

Perception of flexibility of regulations	Labour law regulations	Inflexible (1) – flexible (5)
	Collective bargained regulations	Inflexible (1) – flexible (5)
Degree of risk aversion Importance of...	...foreseeable income	not important (1) – very important (5)
	...foreseeable promotion possibilities	not important (1) – very important (5)
Competence to evaluate/“forecast” market developments	Experience as being self-employed	in months
	Experience as freelancer	in months
	Self-employed friends	yes/no
	Self-employed parents	yes/no
	Apprenticeship	in months
	Experience as trainee	in months
	Experience as employee	in months
Intensity: economic information intake	number of news media used	
Reference Point: Prev. income	Actual financial status	Current annual income in DM

Table 4: Results of the OLS regressions

Dependent Variable: Willingness to become entrepreneur	Model 1	Model 2	Model 3
Perception of flexibility (labour law)	.065**	.055*	-.01
Perception of flexibility (collect. agreements)	.081**	.065**	.215***
Importance of foreseeable income		-.18***	-.19*
Importance of foreseeable promotion		-.09**	-.110
Entrepreneur among friends			.192**
Entrepreneur among parents			.101
Experience as entrepreneur			.134*
Experience as freelancer			-.035
Experience from apprenticeship			.127
Experience as intern			.156**
Experience as employee			-.160**
Intensity of economic information intake			.14*
Actual financial status	-.085**	-.08**	.181**
Expected salary-difference (income-wage)	.078**	.086**	.036
Importance of ideas	.35***	.33***	.207**
Importance of fame	.02	.06*	.042
Dummy 1 : Humanities	.052	.045	.276***
Dummy 2: Social and political studies	-.06*	-.06*	-.027
Dummy 3: Mathematics and natural sciences	.05	.051	.245***
Dummy 4: Art and music	.06*	.047	-.120*
Dummy 5: Technical sciences	-.05	-.025	-.024
Dummy 6: Sports	-.006	.001	-.056
Male dummy	.079**	.074**	.190**
Number of semesters studied	.038	.019	-.067
Intention of studys	.051	.056*	.057
Corrected R ² (F-Statistics)	.170 (11.63***)	.212 (13.31***)	.321 (3.94***)

*, **, ***significant on a 10 % , 5 % or 1 % level.

Source: Own data.